HP Compaq 6720s Notebook PC
Maintenance and Service Guide

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Safety warning notice

⚠ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

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1 Product description

Category	Description	Computer models equipped with GLE960 system board	Computer models equipped with GME965 system board
Product Name	HP Compaq 6720s Notebook PC	√	√
Processors	Intel® Core™ 2 Duo processors		
	• T7700 2.40-GHz processor, 4-MB L2 cache, 800-MHz front side bus (FSB)		√
	• T7500 2.20-GHz processor, 4-MB L2 cache, 800-MHz FSB		√
	• T7300 2.00-GHz processor, 4-MB L2 cache, 800-MHz FSB		√
	• T7100 1.80-GHz processor, 2-MB L2 cache, 800-MHz FSB		√
	• T5450 1.67-GHz processor, 2-MB L2 cache, 667-MHz front side bus FSB		√
	Intel Celeron® M processors		
	• 550 2.00-GHz processor, 1-MB L2 cache, 533-MHz FSB	√	
	• 540 1.86-GHz processor, 1-MB L2 cache, 533-MHz FSB	√	
Chipset	Northbridge: Intel GME965 with up to 800-MHz FSB		√
	Northbridge: Intel GLE960 with up to 533-MHz FSB	√	
	Southbridge: Intel ICH8M	√	√
Graphics	Intel Universal Memory Architecture (UMA) graphics subsystem integrated with shared video memory (dynamically allocated)	√	√
Panel	All display assemblies include 2 wireless local area network (WLAN) antennae	√	√
	• 15.4-inch WXGA BrightView	√	√
	• 15.4-inch WXGA	√	√
Memory	2 customer-accessible/upgradable memory module slots	√	√
	Supports dual-channel memory	√	√

Category	Description	Computer models equipped with GLE960 system board	Computer models equipped with GME965 system board
	Supports up to 4 GB of system RAM	√	√
	PC2-5300, 667-MHz, DDR2	√	√
	Supports the following configurations in all countries and regions except Brazil: • 4096-MB total system memory (2048 × 2, dual-channel) • 3072-MB total system memory (2048 + 1024) • 2560-MB total system memory (2048 + 512) • 2048-MB total system memory (1024 × 2, dual-channel) • 2048-MB total system memory (2048 × 1) • 1536-MB total system memory (1024 + 512) • 1024-MB total system memory (512 × 2, dual-channel) • 1024-MB total system memory (1024 × 1) • 512-MB total system memory (512 × 1)	√	√
	Supports the following configurations only in Brazil: • 2048-MB total system memory (2048 × 1) • 2048-MB total system memory (1024 × 2, dual-channel) • 1024-MB total system memory (1024 × 1) • 1024-MB total system memory (512 × 2, dual-channel) • 512-MB total system memory (512 × 1)	√	√
Hard drives	Supports 9.5-mm, 2.5-inch hard drives	√	√
	Customer-accessible	√	√
	Serial ATA	√	√
	Supports the following drives: • 160-GB, 5400-rpm • 120-GB, 5400-rpm • 80-GB, 5400-rpm	√	√
	HP 3D DriveGuard	√	√
Optical drives	Fixed (removal of 1 screw required)	√	√
	Customer-accessible	√	√
	Parallel ATA	√	√

Category	Description	Computer models equipped with GLE960 system board	Computer models equipped with GME965 system board
	12.7-mm tray load	√	√
	Supports the following drives: • DVD±RW and CD-RW Super Multi Double-Layer Combo Drive with LightScribe • DVD±RW and CD-RW Super Multi Double-Layer Combo Drive • DVD/CD-RW Combo Drive	√	√
Diskette drive	Supports external USB diskette drive only	√	√
	Supports boot from external USB diskette drive	√	√
	Supports 3-mode diskette drive	√	√
Audio	HD audio - ADI1981	√	√
Modem	56K V.92 1.5-inch data/fax modem with digital line guard	√	√
	Modem cable included in Brazil, the Czech Republic, Europe, France, Greece, Hungary, Israel, Latin America, Poland, Russia, Saudi Arabia, Slovakia, Slovenia, South Africa, Turkey, and the United Kingdom	√	√
Ethernet	Intel 82562GT	√	√
	S3/S4/S5 wake on LAN: DC - no	√	√
	S3/S4/S5 wake on LAN: AC - yes	√	√
Wireless	**Integrated WLAN options by way of wireless module:**		
	2 WLAN antennae built into display assembly	√	√
	Support for no-WLAN option	√	√
	Support for the following WLAN formats: • Intel 802.11a/b/g/n • Broadcom 802.11a/b/g • Broadcom 802.11b/g	√	√
	• Intel 802.11a/b/g • Intel 802.11b/g		√
	Integrated personal area network (PAN) options by way of Bluetooth® module:		
	Support for no-WPAN option	√	√
	Broadcom Bluetooth 2.0+EDR	√	√
External media card	One ExpressCard/54 slot	√	√

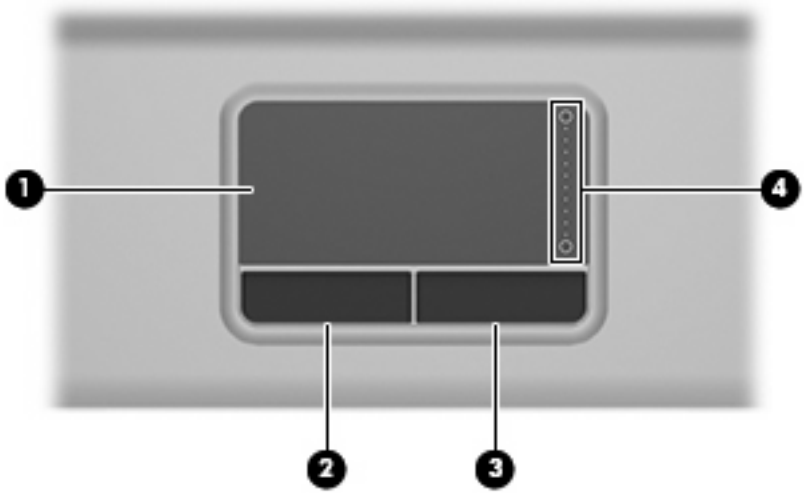
Category	Description	Computer models equipped with GLE960 system board	Computer models equipped with GME965 system board
	SD/MMC Card Reader supporting Secure Digital (SD) Memory Card and MultiMediaCard (MMC)	√	√
Ports	Audio-in (mono microphone)	√	√
	Audio-out (stereo headphone)	√	√
	RJ-11 (modem)	√	√
	RJ-45 (Ethernet, includes link and activity lights)	√	√
	USB (3)	√	√
	VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75-GHz (hot plug/unplug with auto-detect)	√	√
	2-pin AC power	√	√
Keyboard/pointing devices	11.97-inch keyboard with embedded numeric keypad	√	√
	TouchPad only, with 2 TouchPad buttons and vertical scrolling (taps enabled as default)	√	√
Power requirements	65-W AC adapter with localized cable plug support (2-wire plug with ground pin, supports 2-pin DC connector)	√	√
	6-cell, 55-Wh Li-ion battery	√	√
	6-cell, 47-Wh Li-ion battery	√	√
Security	Supports Kensington security sock	√	√
Operating system	**Preinstalled:**		
	Windows Vista® Basic 32 with Office Ready	√	√
	Windows Vista Basic 32 Japan with Office Personal (in Japan only)	√	√
	Windows Vista Business 32 with Office Ready	√	√
	Windows Vista Business 32 Japan with Office Personal (in Japan only)	√	√
	Windows Vista Home Premium with Office Ready	√	√
	FreeDOS	√	√
	Red Flag Linux (in the People's Republic of China only)	√	√
	Restore media:		
	Windows Vista Basic 32	√	√
	Windows Vista Home Premium	√	√
	Windows Vista Business 32	√	√

Category	Description	Computer models equipped with GLE960 system board	Computer models equipped with GME965 system board
	Red Flag Linux (in the People's Republic of China only)	√	√
	DRDVD Vista	√	√
	Certified: Microsoft® WHQL	√	√
Serviceability	**End-user replaceable parts:**		
	AC adapter	√	√
	Battery (system)	√	√
	Hard drive	√	√
	Memory module	√	√
	Optical drive	√	√
	WLAN module	√	√

2 External component identification

Top components

TouchPad



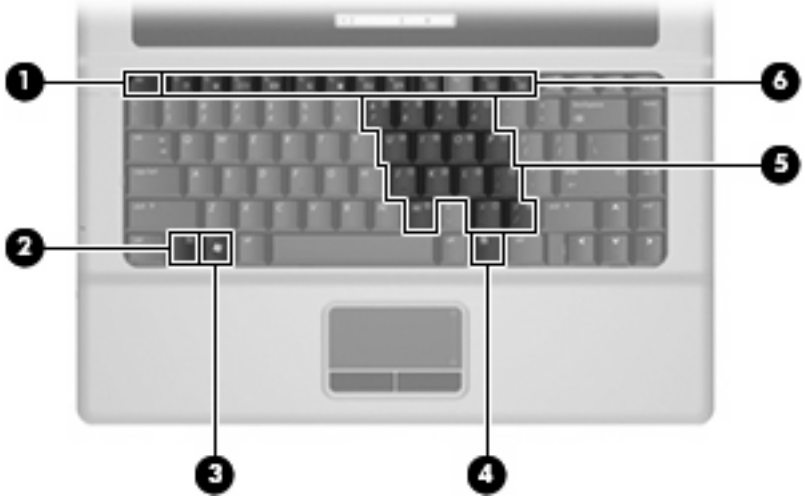
Item	Component	Function
(1)	TouchPad*	Moves the pointer and selects or activates items on the screen.
(2)	Left TouchPad button*	Functions like the left button on an external mouse.
(3)	Right TouchPad button*	Functions like the right button on an external mouse.
(4)	TouchPad scroll zone	Scrolls up or down.

*This table describes factory settings. To view or change pointing device preferences, select **Start > Control Panel > Hardware and Sound > Mouse**.

Buttons, lights, and speaker

Item	Component	Function
(1)	Caps lock light	On: Caps lock is on.
(2)	Wireless button	Turns the wireless feature on or off, but does not establish a wireless connection. **NOTE:** A wireless network must be set up in order to establish a wireless connection.
(3)	Wireless light	• On: An integrated wireless device, such as a wireless local area network (WLAN) device, the HP Broadband Wireless Module, and/or a Bluetooth® device, is on. • Off: All wireless devices are off.
(4)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button to initiate Hibernation. • When the computer is in the Sleep state, press the button briefly to exit Sleep. • When the computer is in Hibernation, press the button briefly to exit Hibernation. If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer. To learn more about your power settings, select **Start > Control Panel > System and Maintenance > Power Options**.
(5)	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state. • Off: The computer is off or in Hibernation.
(6)	Speaker	Produces sound.

Keys

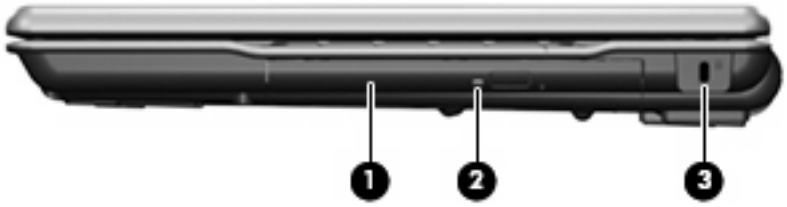


Item	Component	Function
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key or the esc key.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	Windows applications key	Displays a shortcut menu for items beneath the pointer.
(5)	Embedded numeric keypad keys	Can be used like the keys on an external numeric keypad.
(6)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.

Front components

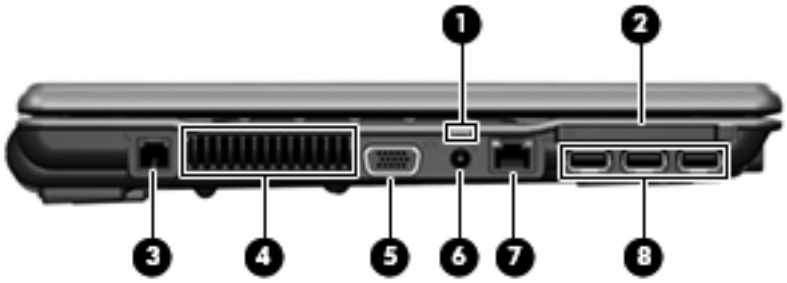
Item	Component	Function
(1)	Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.
(2)	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(3)	SD/MMC Card Reader	Supports the following optional digital card formats: SD Memory Card and MMC.

Right-side components



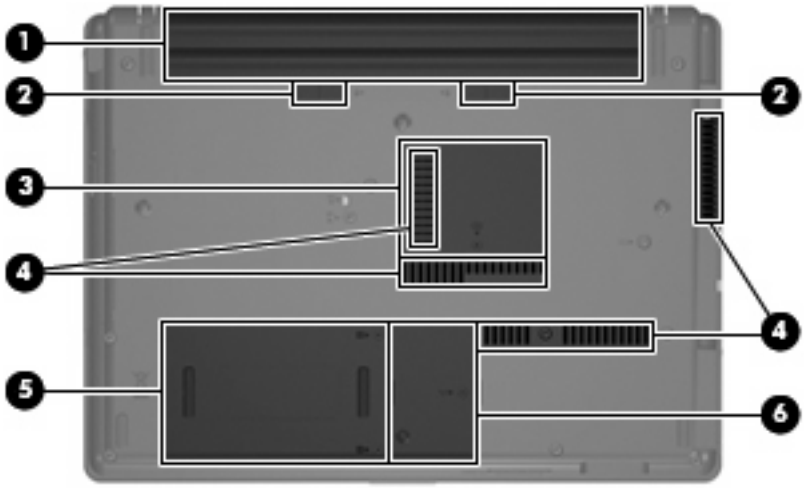
Item	Component	Function
(1)	Optical drive	Reads optical discs and, on select models, also writes to optical discs.
(2)	Optical drive light	Blinking: The optical drive is being accessed.
(3)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left-side components



Item	Component	Function
(1)	Battery light	• Amber: A battery is charging. • Blue: A battery is close to full charge capacity. • Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly. • If the computer is plugged into an external power source, the light turns off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level.
(2)	ExpressCard slot	Supports optional ExpressCards.
(3)	RJ-11 (modem) jack	Connects a modem cable.
(4)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(5)	External monitor port	Connects an external VGA monitor or projector.
(6)	Power connector	Connects an AC adapter.
(7)	RJ-45 (network) jack	Connects a network cable.
(8)	USB ports (3)	Connect optional USB devices.

Bottom components

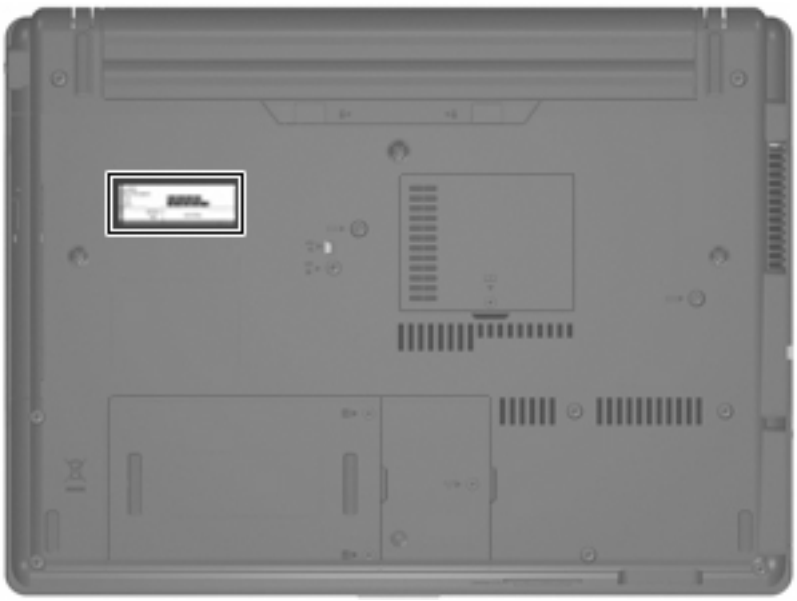


Item	Component	Function
(1)	Battery bay	Holds the battery.
(2)	Battery release latches (2)	Release the battery from the battery bay.
(3)	Memory module compartment	Contains 2 memory module slots.
(4)	Vents (4)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(5)	Hard drive bay	Holds the hard drive.
(6)	WLAN module compartment (select models only)	Contains a WLAN module slot. **CAUTION:** To prevent an unresponsive system, use only a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you install the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support.

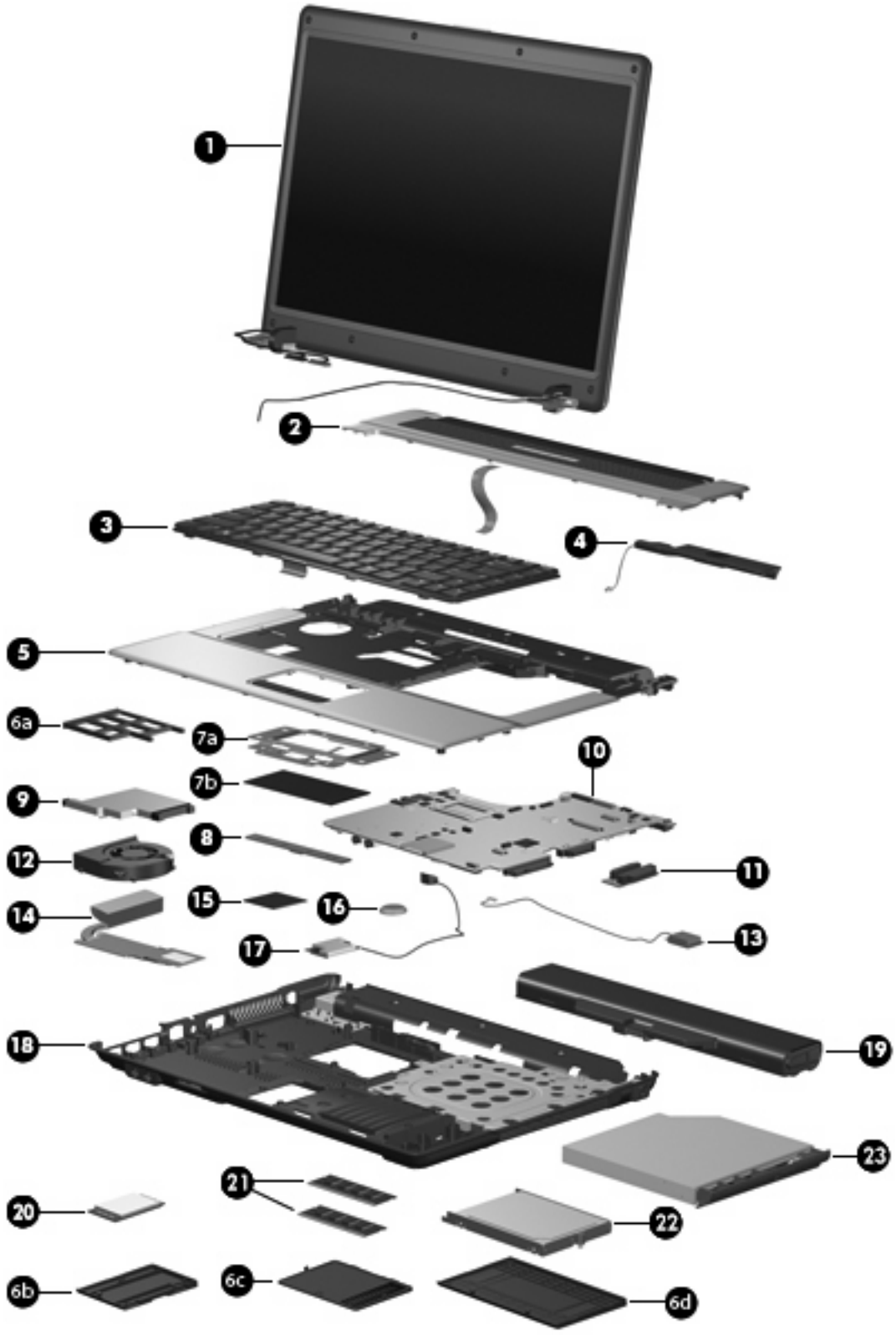
3 Illustrated parts catalog

Serial number location

When ordering parts or requesting information, provide the computer serial number and model number located on the bottom of the computer.



Computer major components



Item	Description	Spare part number
(1)	**Display assemblies** (include 2 WLAN antenna transceivers and cables)	
	15.4-inch, WXGA BrightView	456802-001
	15.4-inch, WXGA	456801-001
	Display internal components:	
	Display bezel	456807-001
	Display enclosure (includes 2 WLAN antenna transceivers and cables)	456808-001
	Display hinges (includes left and right hinges)	456806-001
	Display inverter	456618-001
(2)	**Switch cover** (includes button board and cable)	456800-001
(3)	**Keyboards**	
	For use in Belgium	456624-181
	For use in Brazil	456624-201
	For use in the Czech Republic	456624-221
	For use in Denmark	456624-081
	For use in France	456624-051
	For use in French Canada	456624-121
	For use in Germany	456624-041
	For use in Greece	456624-DJ1
	For use in Hungary	456624-211
	For use in Iceland	456624-DD1
	For use in Israel	456624-BB1
	For use in Italy	456624-061
	For use in Japan	456624-291
	For use in Latin America	456624-161
	For use in the Netherlands	456624-B31
	For use in Norway	456624-091
	For use in Portugal	456624-131
	For use in Russia	456624-251
	For use in Saudi Arabia	456624-171
	For use in Slovakia	456624-231
	For use in Slovenia	456624-BA1
	For use in South Korea	456624-AD1
	For use in Spain	456624-071

Item	Description	Spare part number
	For use in Sweden	456624-B71
	For use in Switzerland	456624-BG1
	For use in Taiwan	456624-AB1
	For use in Thailand	456624-281
	For use in Turkey	456624-141
	For use in the United Kingdom	456624-031
	For use in the United States	456624-001
(4)	**Speaker**	456593-001
(5)	**Top cover** (includes TouchPad board and cable, and TouchPad button board and cable)	456803-001
	Plastics Kit (see Plastics Kit on page 20 for more Plastics Kit spare part information):	456614-001
(6a)	**ExpressCard slot bezel**	
(6b)	**WLAN module compartment cover**	
(6c)	**Memory module compartment cover**	
(6d)	**Hard drive bay cover**	
	TouchPad components	
(7a)	**TouchPad bracket** (included in the TouchPad Miscellaneous Kit, which also includes the TouchPad button board actuators, which are not illustrated)	456622-001
(7b)	**TouchPad board** (includes cable)	456600-001
(8)	**TouchPad button board** (includes cable)	456601-001
(9)	**ExpressCard assembly**	456607-001
(10)	**System boards** (include replacement thermal material)	
	For use only with computer models equipped with Intel Core 2 Duo processors	456608-001
	For use only with computer models equipped with Intel Celeron M processors	456609-001
(11)	**Optical drive connector board**	456805-001
(12)	**Fan**	456604-001
(13)	**Broadcom Bluetooth modules** (do not include Bluetooth module cable) **NOTE:** The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 456594-001. See Cable Kit on page 21 for more Cable Kit spare part number information.	
	For use in all countries and regions except Japan and Asia Pacific countries and regions	398393-002
	For use only in Japan and Asia Pacific countries and regions	450066-001
(14)	**Heat sink** (includes replacement thermal material)	456605-001
(15)	**Processors** (includes replacement thermal material)	
	Intel Core 2 Duo processors:	
	• T7700 2.40-GHz (4-MB L2 cache, 800-MHz FSB)	446894-001

Item	Description	Spare part number
	• T7500 2.20-GHz (4-MB L2 cache, 800-MHz FSB)	446893-001
	• T7300 2.00-GHz (4-MB L2 cache, 800-MHz FSB)	446892-001
	• T7100 1.80-GHz (2-MB L2 cache, 800-MHz FSB)	446891-001
	• T5450 1.67-GHz (2-MB L2 cache, 667-MHz FSB)	454598-001
	Intel Celeron M processors:	
	• 550 2.00-GHz (1-MB L2 cache, 533-MHz FSB)	446888-001
	• 540 1.86-GHz (1-MB L2 cache, 533-MHz FSB)	446889-001
(16)	**RTC battery**	449137-001
(17)	**Modem module** **NOTE:** The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 456594-001. See Cable Kit on page 21 for more Cable Kit spare part number information.	441074-001
(18)	**Base enclosure** (includes rubber feet)	456804-001
	Rubber Kit (not illustrated, contains 6 computer feet and 8 display bezel screw covers)	456616-001
(19)	**Batteries**	
	6-cell, 47-Wh Li-ion battery	456864-001
	6-cell, 55-Wh Li-ion battery	456865-001
(20)	**WLAN modules**	
	Intel 802.11a/b/g/n WLAN modules:	
	• For use in Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam	441086-001
	• For use in Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan	441086-002
	• For use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea	441086-003
	• For use in Japan	441086-291
	Broadcom 802.11a/b/g WLAN modules:	
	• For use in Canada, Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States	441075-001
	• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the	441075-002

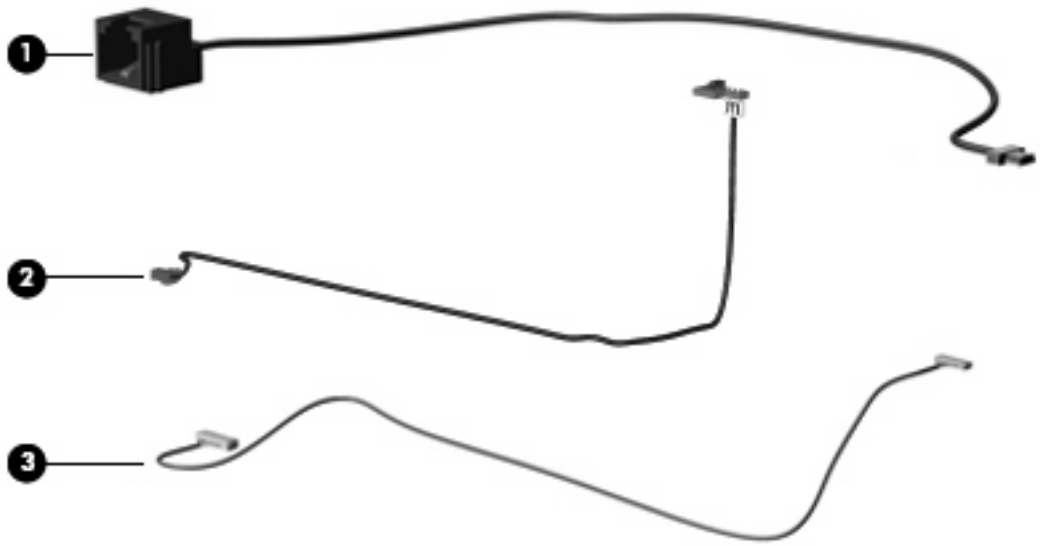
Item	Description	Spare part number
	People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	
	• For use in Japan	441075-291
	Intel 802.11a/b/g WLAN modules:	
	• For use in Antigua & Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, the United States, Uruguay, Venezuela, and Vietnam	441082-001 and 448674-001
	• For use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan	441082-002 and 448674-002
	• For use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea	441082-003 and 448674-003
	• For use in Japan	441082-291 and 448674-291
	• For use in South Korea	456576-001
	Broadcom 802.11b/g WLAN modules:	
	• For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States	441090-001
	• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua & Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia & Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan,	441090-002

Item	Description	Spare part number
	Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad & Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	
	• For use in Japan	441090-291
	Intel 802.11b/g WLAN module for use in Thailand	409280-004
(21)	**Memory modules** (PC2-5300, 667-MHz, DDR2)	
	2048-MB	417506-001
	1024-MB	414046-001
	512-MB	414045-001
(22)	**Hard drives** (include hard drive bracket)	
	160-GB, 5400-rpm	457014-001
	120-GB, 5400-rpm	457013-001
	80-GB, 5400-rpm	457012-001
(23)	**Optical drives** (include bezel and bracket)	
	DVD±RW and CD-RW Double-Layer Combo Drive with LightScribe	456799-001
	DVD±RW and CD-RW Double-Layer Combo Drive	456798-001
	DVD/CD-RW Combo Drive	456797-001
	Cable Kit (not illustrated; see Cable Kit on page 21 for more Cable Kit spare part number information)	456594-001

Plastics Kit

Item	Description	Spare part number
	Plastics Kit:	456614-001
(1)	Hard drive bay cover (includes 2 captive screws, secured by C-clips)	
(2)	WLAN module compartment cover (includes one captive screw, secured by a C-clip)	
(3)	ExpressCard slot bezel	
(4)	Memory module compartment cover (includes one captive screw, secured by a C-clip)	

Cable Kit



Item	Description	Spare part number
	Cable Kit:	456594-001
(1)	RJ-11 jack cable	
(2)	Display lid switch module and cable	
(3)	Bluetooth module cable	

Mass storage devices

Item	Description	Spare part number
(1)	**Optical drives** (include bezel and bracket)	
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive with LightScribe	456799-001
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	456798-001
	DVD/CD-RW Combo Drive	456797-001
(2)	**Hard drives** (include bracket)	
	160-GB, 5400-rpm	457014-001
	120-GB, 5400-rpm	457013-001
	80-GB, 5400-rpm	457012-001

Miscellaneous parts

Description	Spare part number
65-W AC adapter	417220-001
Logo Kit	456617-001
Nylon carrying case	325814-001
USB 1.1 diskette drive	359118-001
Power cords:	
For use in Australia	342714-011
For use in Brazil	342714-201
For use in Denmark	342714-081
For use in Europe, the Middle East, and Africa	342714-021
For use in Israel	342714-BB1
For use in Italy	342714-061
For use in Japan	342714-291
For use in South Korea	342714-AD1
For use in Switzerland	342714-AG1
For use in the United Kingdom	342714-031
For use the United States	342714-001
Screw Kit • Phillips PM3.0×4.0 screw • Phillips PM2.5×12.0 captive screw • Phillips PM2.5×10.0 captive screw • Phillips PM2.5×7.0 captive screw • Phillips PM2.5×7.0 screw • Phillips PM2.5×4.0 screw • Phillips PM2.0×8.0 screw • Phillips PM2.0×6.0 screw • Phillips PM2.0×5.0 captive screw • Phillips PM2.0×4.0 screw • Phillips PM2.0×2.0 broad-head screw • Torx T8M2.5×9.0 screw • Torx T8M2.5×7.0 screw • Torx T8M2.5×6.0 screw • Torx T8M2.5×4.0 screw	456615-001

Description	Spare part number
• Torx T8M2.5×3.0 broad-head screw	
• Torx T8M2.0×4.0 screw	

Sequential part number listing

Spare part number	Description
342714-001	Power cord for use in the United States
342714-011	Power cord for use in Australia and New Zealand
342714-021	Power cord for use in Europe, the Middle East, Africa
342714-031	Power cord for use in the United Kingdom
342714-061	Power cord for use in Italy
342714-081	Power cord for use in Denmark
342714-201	Power cord for use in Brazil
342714-291	Power cord for use in Japan
342714-AD1	Power cord for use in South Korea
342714-AG1	Power cord for use in Switzerland
342714-BB1	Power cord for use in Israel
398393-002	Bluetooth module for use in North America **NOTE:** The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 456594-001. See Cable Kit on page 21 for more Cable Kit spare part number information.
409280-004	Intel 802.11b/g WLAN module for use in Thailand
414045-001	512-MB memory module (PC2-5300, 667-MHz, DDR2)
414046-001	1024-MB memory module (PC2-5300, 667-MHz, DDR2)
417220-001	65-W AC adapter
417506-001	2048-MB memory module (PC2-5300, 667-MHz, DDR2)
441074-001	Modem module (includes modem module cable) **NOTE:** The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 456594-001. See Cable Kit on page 21 for more Cable Kit spare part number information.
441075-001	Broadcom 802.11a/b/g WLAN module for use in Canada, Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States
441075-002	Broadcom 802.11a/b/g WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana,

Spare part number	Description
	Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
441075-291	Broadcom 802.11a/b/g WLAN module for use in Japan
441082-001	Intel 802.11a/b/g WLAN module for use in Antigua & Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, the United States, Uruguay, Venezuela, and Vietnam
441082-002	Intel 802.11a/b/g WLAN module for use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan
441082-003	Intel 802.11a/b/g WLAN module for use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea
441082-291	Intel 802.11a/b/g WLAN module for use in Japan
441086-001	Intel 802.11a/b/g/n WLAN module for use in Antigua & Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, the United States, Uruguay, Venezuela, and Vietnam
441086-002	Intel 802.11a/b/g/n WLAN module for use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan
441086-003	Intel 802.11a/b/g/n WLAN module for use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea
441086-291	Intel 802.11a/b/g/n WLAN module for use in Japan
441090-001	Broadcom 802.11b/g WLAN module for use in Canada, Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States
441090-002	Broadcom 802.11b/g WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory

Spare part number	Description
	Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
441090-291	Broadcom 802.11b/g WLAN module for use in Japan
446888-001	Intel Celeron M 540 1.86-GHz processor (1-MB L2 cache, 533-MHz FSB, includes replacement thermal material)
446889-001	Intel Celeron M 540 2.00-GHz processor (1-MB L2 cache, 533-MHz FSB, includes replacement thermal material)
446891-001	Intel Core 2 Duo T7100 1.80-GHz processor (2-MB L2 cache, 800-MHz FSB, includes replacement thermal material)
446892-001	Intel Core 2 Duo T7300 2.00-GHz processor (4-MB L2 cache, 800-MHz FSB, includes replacement thermal material)
446893-001	Intel Core 2 Duo T7500 2.20-GHz processor (4-MB L2 cache, 800-MHz FSB, includes replacement thermal material)
446894-001	Intel Core 2 Duo T7700 2.40-GHz processor (4-MB L2 cache, 800-MHz FSB, includes replacement thermal material)
448674-001	Intel 802.11a/b/g WLAN module for use in Antigua & Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, the United States, Uruguay, Venezuela, and Vietnam
448674-002	Intel 802.11a/b/g WLAN module for use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan
448674-003	Intel 802.11a/b/g WLAN module for use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea
448674-291	Intel 802.11a/b/g WLAN module for use in Japan
449137-001	RTC battery
450066-001	Bluetooth module for use in Japan and Asia Pacific countries and regions **NOTE:** The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 456594-001. See Cable Kit on page 21 for more Cable Kit spare part number information.
454598-001	Intel Core 2 Duo T5450 1.67-GHz processor (2-MB L2 cache, 667-MHz FSB, includes replacement thermal material)
456576-001	Intel 802.11a/b/g WLAN module for use in South Korea
456593-001	Speaker

Spare part number	Description
456594-001	Cable Kit (see Cable Kit on page 21 for more Cable Kit spare part information)
456600-001	TouchPad board (includes cable)
456601-001	TouchPad button board (includes cable)
456604-001	Fan
456605-001	Heat sink (includes replacement thermal material)
456607-001	ExpressCard assembly
456608-001	System board for use only with computer models equipped with Intel Core 2 Duo processors (includes replacement thermal material)
456609-001	System board for use only with computer models equipped with Intel Celeron M processors (includes replacement thermal material)
456614-001	Plastics Kit (see Plastics Kit on page 20 for more Plastics Kit spare part information)
456615-001	Screw Kit
456616-001	Rubber Kit (contains 6 computer feet and 8 display bezel screw covers)
456617-001	Logo Kit
456618-001	Display inverter
456622-001	TouchPad Miscellaneous Kit (includes TouchPad bracket and TouchPad button board actuators)
456624-001	Keyboard for use in the United States
456624-031	Keyboard for use in the United Kingdom
456624-041	Keyboard for use in Germany
456624-051	Keyboard for use in France
456624-061	Keyboard for use in Italy
456624-071	Keyboard for use in Spain
456624-081	Keyboard for use in Denmark
456624-091	Keyboard for use in Norway
456624-121	Keyboard for use in French Canada
456624-131	Keyboard for use in Portugal
456624-141	Keyboard for use in Turkey
456624-161	Keyboard for use in Latin America
456624-171	Keyboard for use in Saudi Arabia
456624-181	Keyboard for use in Belgium
456624-201	Keyboard for use in Brazil
456624-211	Keyboard for use in Hungary
456624-221	Keyboard for use in the Czech Republic
456624-231	Keyboard for use in Slovakia

Spare part number	Description
456624-251	Keyboard for use in Russia
456624-281	Keyboard for use in Thailand
456624-291	Keyboard for use in Japan
456624-AB1	Keyboard for use in Taiwan
456624-AD1	Keyboard for use in South Korea
456624-B31	Keyboard for use in the Netherlands
456624-B71	Keyboard for use in Sweden and Finland
456624-BA1	Keyboard for use in Slovenia
456624-BB1	Keyboard for use in Israel
456624-BG1	Keyboard for use in Switzerland
456624-DD1	Keyboard for use in Iceland
456624-DJ1	Keyboard for use in Greece
456797-001	DVD/CD-RW Combo Drive (includes bezel and bracket)
456798-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive with LightScribe (includes bezel and bracket)
456799-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive (includes bezel and bracket)
456800-001	Switch cover (includes button board and cable)
456801-001	15.4-inch, WXGA display assembly (includes 2 WLAN antenna transceivers and cables)
456802-001	15.4-inch, WXGA display assembly with BrightView (includes 2 WLAN antenna transceivers and cables)
456803-001	Top cover (includes TouchPad board and cable, and TouchPad button board and cable)
456804-001	Base enclosure (includes rubber feet)
456805-001	Optical drive connector board
456806-001	Display hinges (includes left and right hinges)
456807-001	Display bezel
456808-001	Display enclosure (includes 2 wireless antenna transceivers and cables)
456864-001	6-cell, 47-Wh Li-ion battery
456865-001	6-cell, 55-Wh Li-ion battery
457012-001	80-GB, 5400-rpm hard drive (includes bracket)
457013-001	120-GB, 5400-rpm hard drive (includes bracket)
457014-001	160-GB, 5400-rpm hard drive (includes bracket)

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

You will need the following tools to complete the removal and replacement procedures:

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers
- Torx T8 screwdriver

Service considerations

The following sections include some of the considerations that you must keep in mind during disassembly and assembly procedures.

NOTE: As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic parts

Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and connectors

△ **CAUTION:** When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

△ **CAUTION:** Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “FRAGILE.”

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

△ **CAUTION:** To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you area ready to install them.

Use nonmagnetic tools.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

△ **CAUTION:** A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels

	Relative humidity		
Event	**10%**	**40%**	**55%**
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

The following table lists the shielding protection provided by antistatic bags and floor mats.

Material	Use	Voltage protection level
Antistatic plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

Unknown user password

If the computer you are servicing has an unknown user password, follow these steps to clear the password:

NOTE: These steps also clear CMOS.

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the real-time clock (RTC) battery (see RTC battery on page 74).
6. Wait approximately 5 minutes.
7. Replace the RTC battery and reassemble the computer.
8. Connect AC power to the computer. Do not reinsert any batteries at this time.
9. Turn on the computer.

All passwords and all CMOS settings have been cleared.

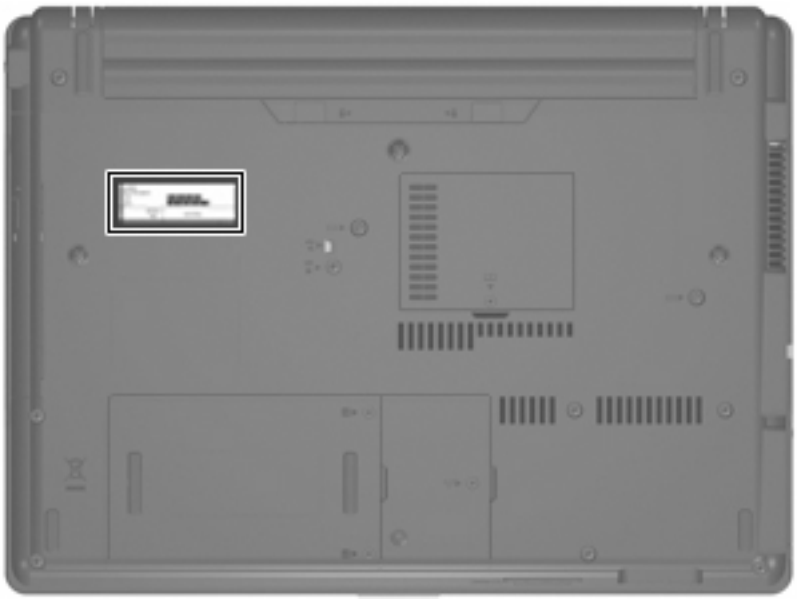
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 82 screws, in 18 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

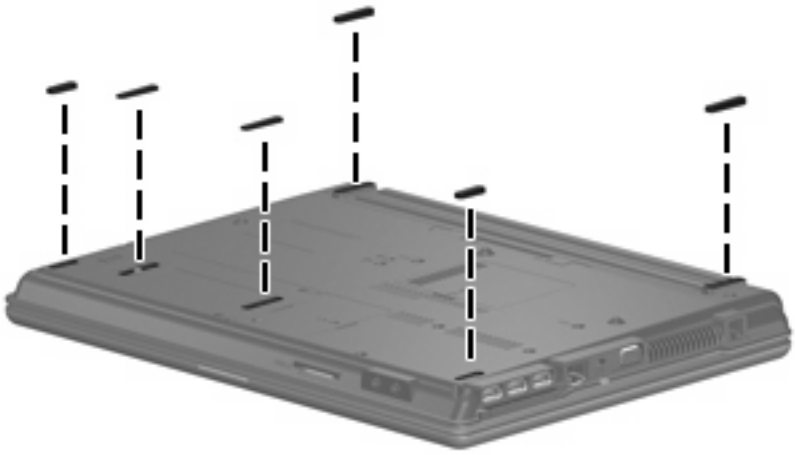
Serial number

Report the computer serial number to HP when requesting information or ordering spare parts. The serial number is located on the bottom of the computer.



Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Kit, spare part number 456616-001. There are 6 rubber feet that attach to the base enclosure in the locations illustrated below.



Battery

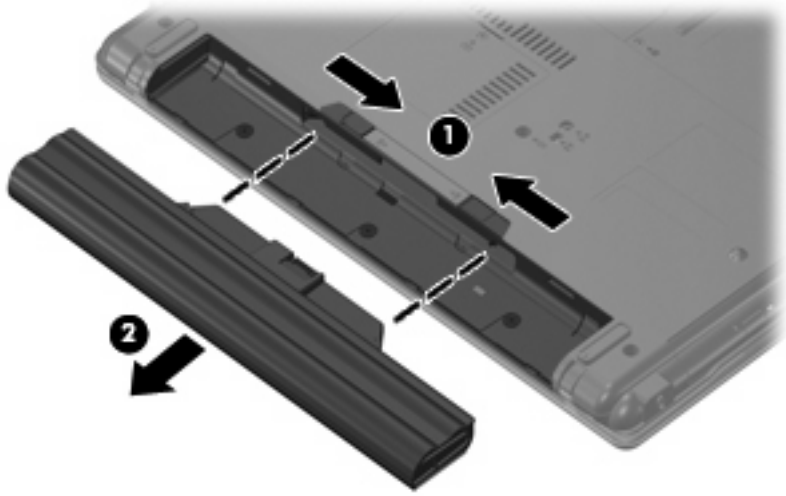
Description	Spare part number
6-cell, 55-Wh Li-ion battery	456865-001
6-cell, 47-Wh Li-ion battery	456864-001

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

Remove the battery:

1. Turn the computer upside down on a flat surface, with the battery bay toward you.
2. Slide the battery release latches **(1)** to release the battery.
3. Remove the battery **(2)** from the computer.



Install the battery by inserting it into the battery bay until you hear a click.

Hard drive

NOTE: All hard drive spare part kits include a hard drive bracket.

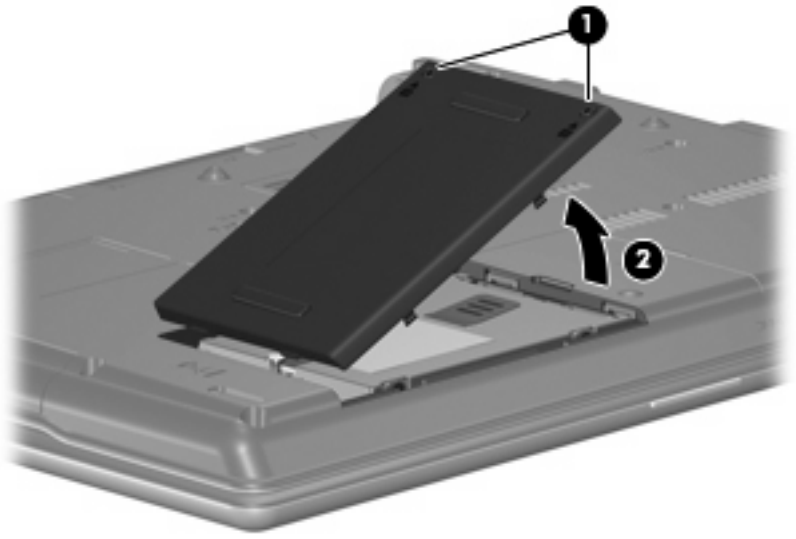
Description	Spare part number
160-GB, 5400-rpm hard drive	457014-001
120-GB, 5400-rpm hard drive	457013-001
80-GB, 5400-rpm hard drive	457012-001

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).

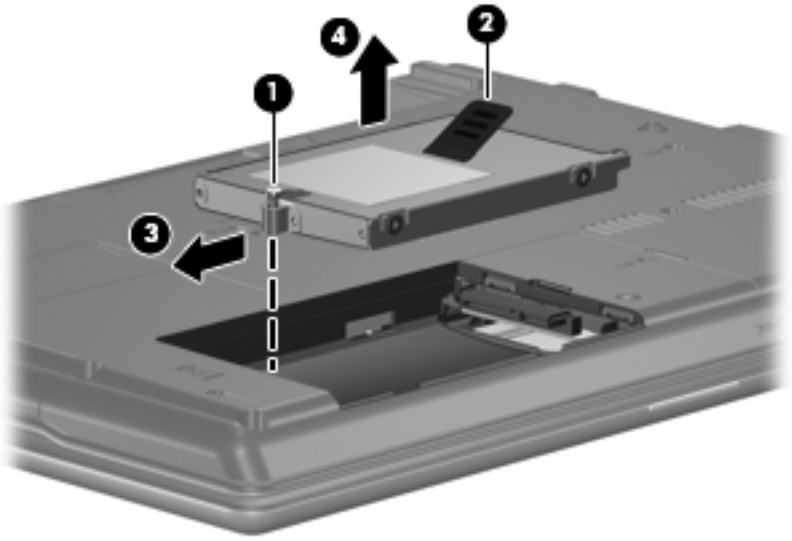
Remove the hard drive:

1. Position the computer with the front toward you.
2. Loosen the two Phillips PM2.0×5.0 captive screws **(1)** that secure the hard drive bay cover to the computer.
3. Lift the right side of the hard drive bay cover **(2)**, swing it to left, and remove the cover. The hard drive bay cover is included in the Plastics Kit, spare part number 456614-001.

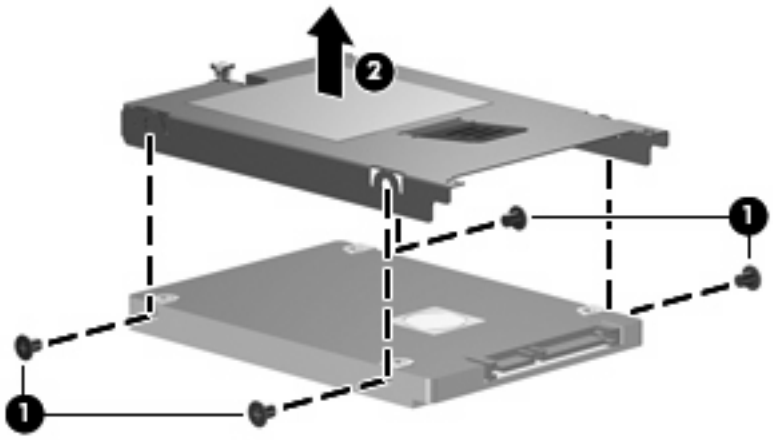


4. Loosen the Phillips PM2.5×12.0 captive screw **(1)** that secures the hard drive to the computer.
5. Grasp the Mylar tab **(2)** on the hard drive and slide the hard drive **(3)** to the left to disconnect it from the system board.

6. Remove the hard drive **(4)** from the hard drive bay.



7. If it is necessary to replace the hard drive bracket, remove the two Phillips PM3.0×4.0 hard drive bracket screws **(1)** from each side of the hard drive.
8. Lift the bracket **(2)** straight up to remove it from the hard drive.



Reverse this procedure to reassemble and install the hard drive.

WLAN module

Description	Spare part number
Intel 802.11a/b/g/n WLAN modules:	
• For use in Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam	441086-001
• For use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan	441086-002
• For use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea	441086-003
• For use in Japan	441086-291
Broadcom 802.11a/b/g WLAN modules:	
• For use in Canada, Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States	441075-001
• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	441075-002
• For use in Japan	441075-291
Intel 802.11a/b/g WLAN modules:	
• For use in Antigua & Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, the United States, Uruguay, Venezuela, and Vietnam	441082-001 and 448674-001
• For use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania,	441082-002 and 448674-002

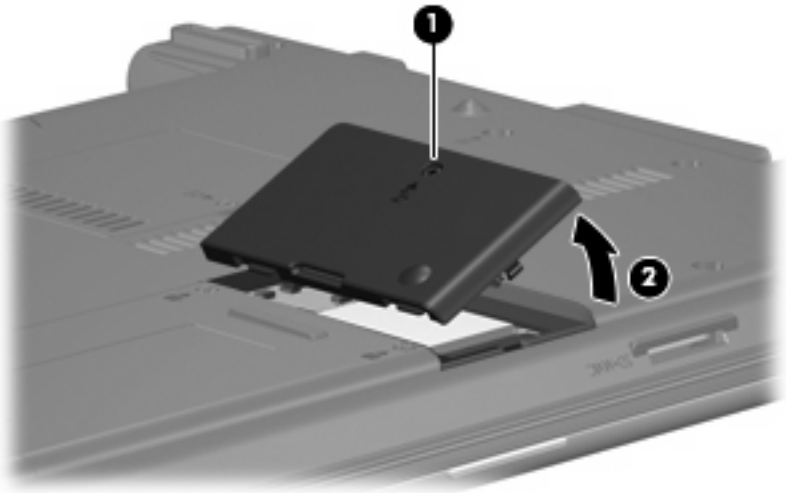
Description	Spare part number
Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan	
• For use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea	441082-003 and 448674-003
• For use in Japan	441082-291 and 448674-291
Broadcom 802.11b/g WLAN modules:	
• For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States	441090-001
• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua & Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia & Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad & Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	441090-002
• For use in Japan	441090-291
Intel 802.11b/g WLAN module for use in Japan	448675-004
Intel 802.11b/g WLAN module for use in Thailand	409280-004

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).

Remove the WLAN module:

1. Position the computer with the front toward you.
2. Loosen the Phillips PM2.0×5.0 captive screw **(1)** that secures the WLAN module compartment cover to the computer.
3. Lift the right side of the WLAN module compartment cover **(2)**, swing it to left, and remove the cover. The WLAN module compartment cover is included in the Plastics Kit, spare part number 456614-001.

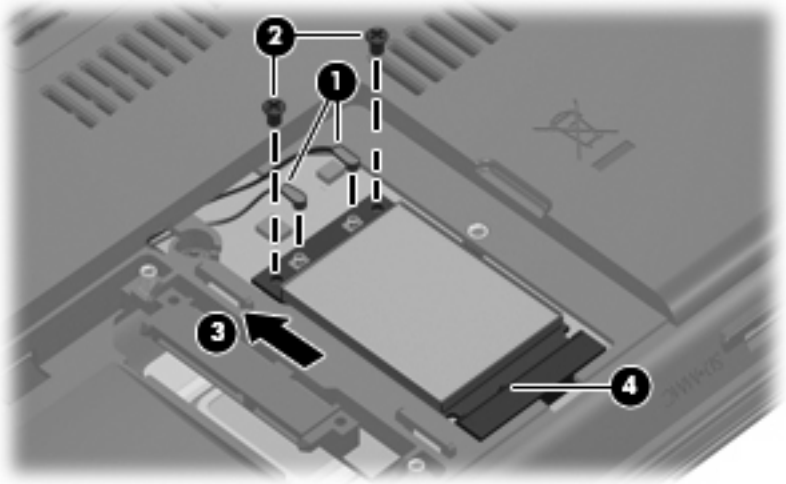


4. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

NOTE: The black WLAN antenna cable is connected to the WLAN module "Main" terminal. The white WLAN antenna cable is connected to the WLAN module "Aux" terminal.

5. Remove the two Phillips PM2.5×4.0 screws **(2)** that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)
6. Remove the WLAN module **(3)** by pulling the module away from the slot at an angle.

NOTE: WLAN modules are designed with a notch **(4)** to prevent incorrect installation.



Reverse this procedure to install the WLAN module.

Memory module

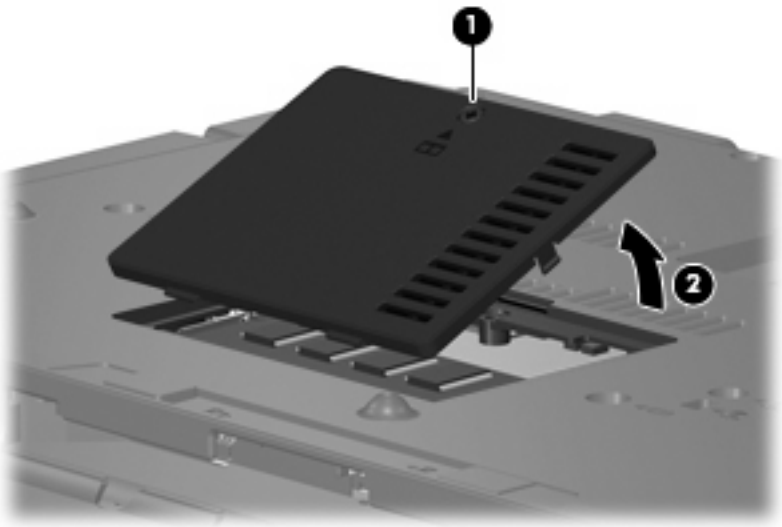
Description	Spare part number
2048-MB (PC2-5300, 667-MHz, DDR2)	417506-001
1024-MB (PC2-5300, 667-MHz, DDR2)	414046-001
512-MB (PC2-5300, 667-MHz, DDR2)	414045-001

Before removing the memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).

Remove the memory module:

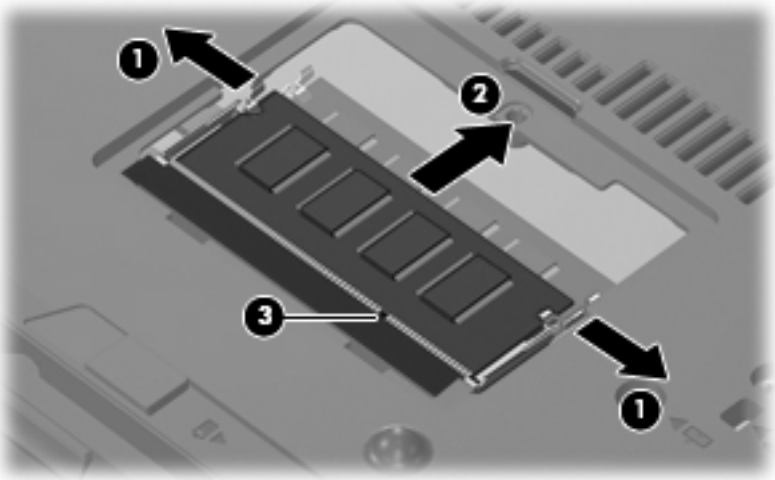
1. Loosen the Phillips PM2.0×5.0 captive screw **(1)** that secures the memory module compartment cover to the computer.
2. Lift the front edge of the cover **(2)**, swing it up and back, and remove the cover. The memory module compartment cover is included in the Plastics Kit, spare part number 456614-001.



3. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The edge of the module opposite the slot rises away from the computer.)

4. Remove the memory module **(2)** by pulling the module away from the slot at an angle.

NOTE: Memory modules are designed with a notch **(3)** to prevent incorrect installation into the memory module slot.



Reverse this procedure to install a memory module.

Optical drive

NOTE: All optical drive spare part kits include an optical drive bezel.

Description	Spare part number
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive with LightScribe	456799-001
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	456798-001
DVD/CD-RW Combo Drive	456797-001

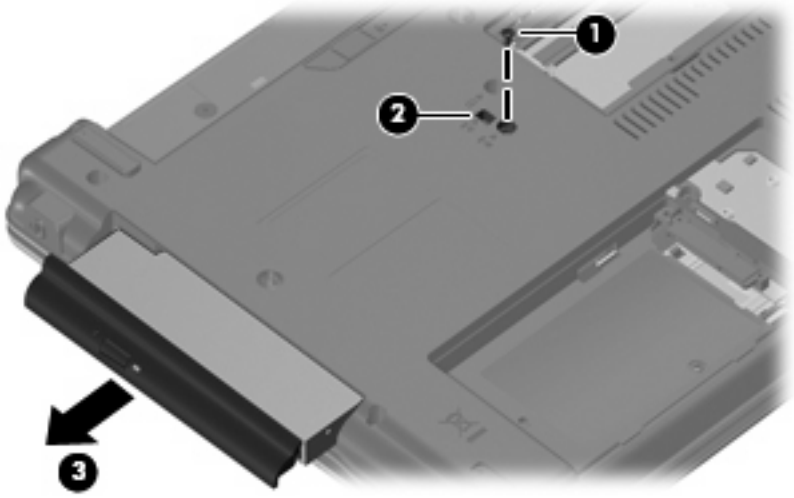
Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).

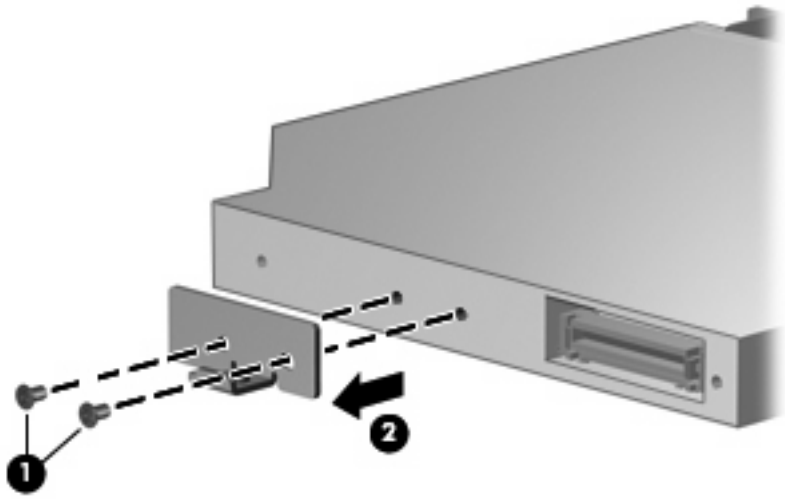
Remove the optical drive:

1. Position the computer with the right side toward you.
2. Remove the Torx T8M2.5×7.0 screw **(1)** that secures the optical drive to the computer.
3. Insert a flat-bladed screwdriver or similar tool into the optical drive tab access **(2)** and press the tab to the left to release the optical drive from the computer.

4. Remove the optical drive **(3)** from the computer.



5. If it is necessary to replace the optical drive bracket, position the optical drive with the rear toward you.
6. Remove the two Phillips PM2.0×4.0 screws **(1)** that secure the optical drive bracket to the optical drive.
7. Remove the optical drive bracket **(2)**.



Reverse this procedure to reassemble and install an optical drive.

Keyboard

For use in:	Spare part number	For use in:	Spare part number
Belgium	456624-181	Norway	456624-091
Brazil	456624-201	Portugal	456624-131
The Czech Republic	456624-221	Russia	456624-251
Denmark	456624-081	Saudi Arabia	456624-171
France	456624-051	Slovakia	456624-231
French Canada	456624-121	Slovenia	456624-BA1
Germany	456624-041	South Korea	456624-AD1
Greece	456624-DJ1	Spain	456624-071
Hungary	456624-211	Sweden and Finland	456624-B71
Iceland	456624-DD1	Switzerland	456624-BG1
Israel	456624-BB1	Taiwan	456624-AB1
Italy	456624-061	Thailand	456624-281
Japan	456624-291	Turkey	456624-141
Latin America	456624-161	The United Kingdom	456624-031
The Netherlands and Europe	456624-B31	The United States	456624-001

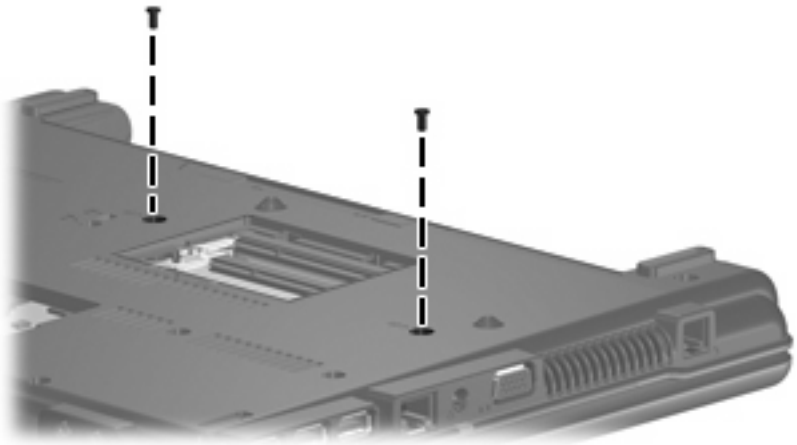
Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).

Remove the keyboard:

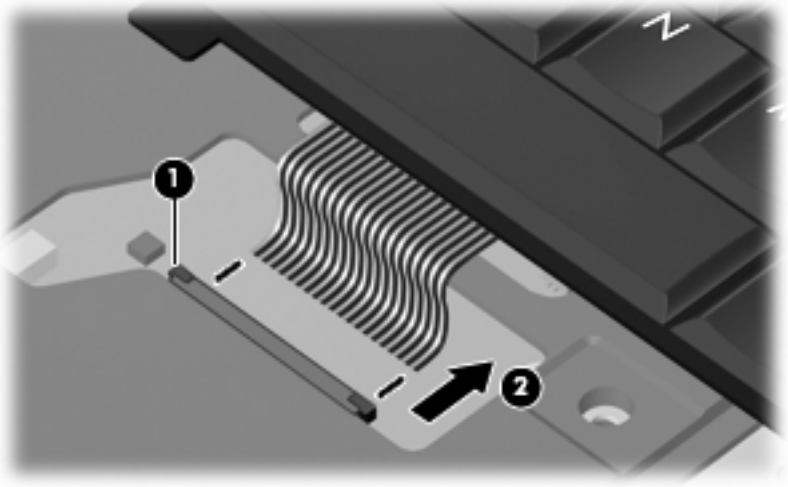
1. Position the computer with the front toward you.

2. Remove the two Torx T8M2.5×7.0 screws that secure the keyboard to the computer.



3. Turn the computer display-side up, with the front toward you.
4. Open the computer as far as possible.
5. Lift the rear edge of the keyboard **(1)** and slide it back until it rests on the display assembly **(2)**.

6. Release the zero insertion force (ZIF) connector **(1)** to which the keyboard cable is attached, and disconnect the keyboard cable **(2)** from the system board.



7. Remove the keyboard.

Reverse this procedure to install the keyboard.

Switch cover

Description	Spare part number
Switch cover (includes button board and cable)	456800-001

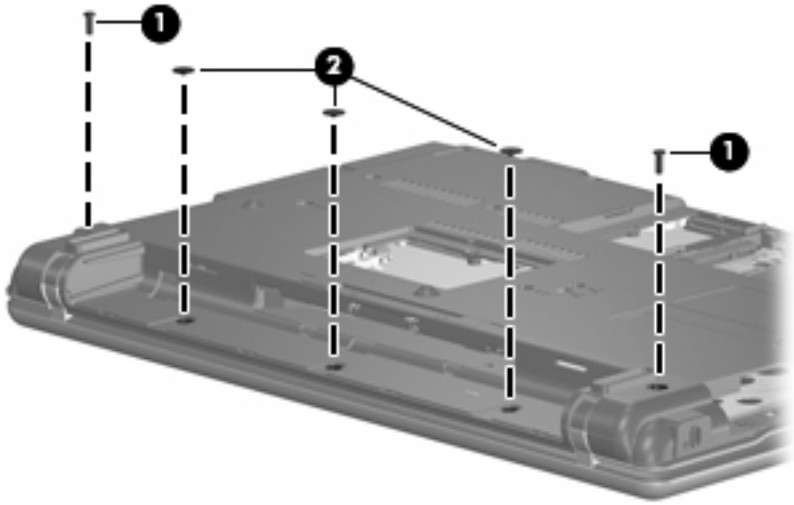
Before removing the switch cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the keyboard (see Keyboard on page 46).

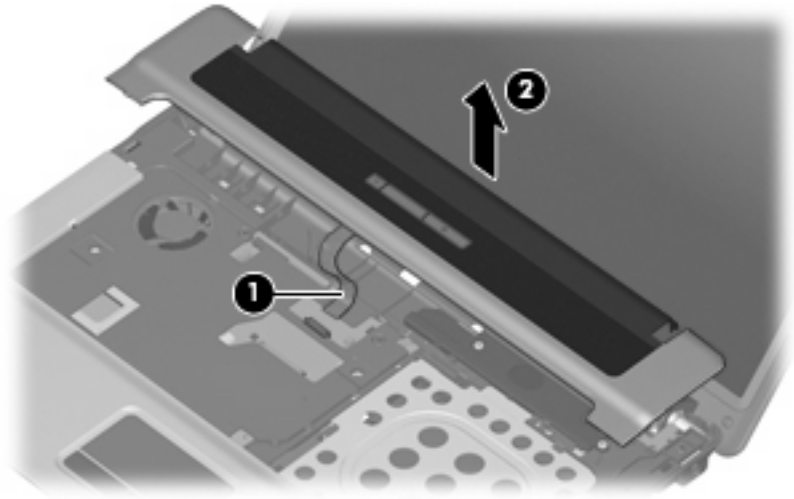
Remove the switch cover:

1. Turn the computer upside down, with the rear panel toward you.

2. Remove the two Torx T8M2.5×9.0 screws **(1)** and the three Torx T8M2.5×3.0 broad-head screws **(2)** that secure the switch cover to the computer.



3. Turn the computer right-side up, with the front toward you.
4. Open the computer as far as possible.
5. Release the ZIF connector to which the button board cable **(1)** is attached, and disconnect the cable from the system board.
6. Remove the switch cover **(2)** by lifting it straight up.



Reverse this procedure to install the switch cover.

Speaker

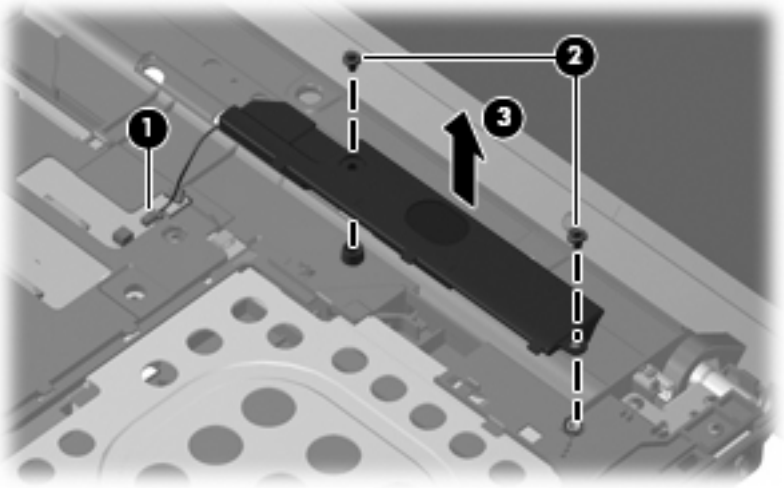
Description	Spare part number
Speaker	456593-001

Before removing the speaker, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the keyboard (see Keyboard on page 46).
6. Remove the switch cover (see Switch cover on page 48).

Remove the speaker:

1. Disconnect the speaker cable **(1)** from the system board.
2. Remove the two Torx T8M2.5×4.0 screws **(2)** that secure the speaker to the top cover.
3. Remove the speaker **(3)** from the top cover.



Reverse this procedure to install the speaker.

Display lid switch module

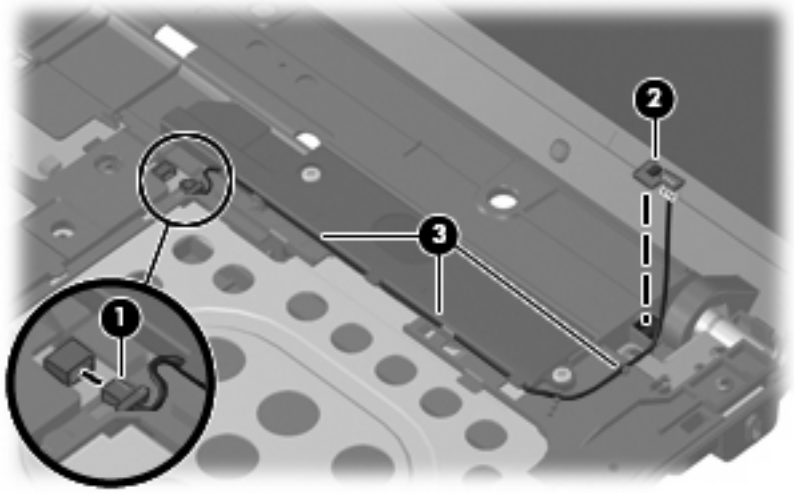
NOTE: The display lid switch module is included in the Cable Kit, spare part number Cable Kit, spare part number 456594-001.

Before removing the display lid switch module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the keyboard (see Keyboard on page 46).
6. Remove the switch cover (see Switch cover on page 48).

Remove the display lid switch module:

1. Disconnect the display lid switch module cable **(1)** from the system board.
2. Remove the display lid switch module **(2)** from the clip built into the top cover.
3. Remove the display lid switch module cable from the clips **(3)** built into the top cover.



Reverse this procedure to install the display lid switch module.

Display assembly

NOTE: All display assembly spare part kits include 2 WLAN antenna transceivers and cables.

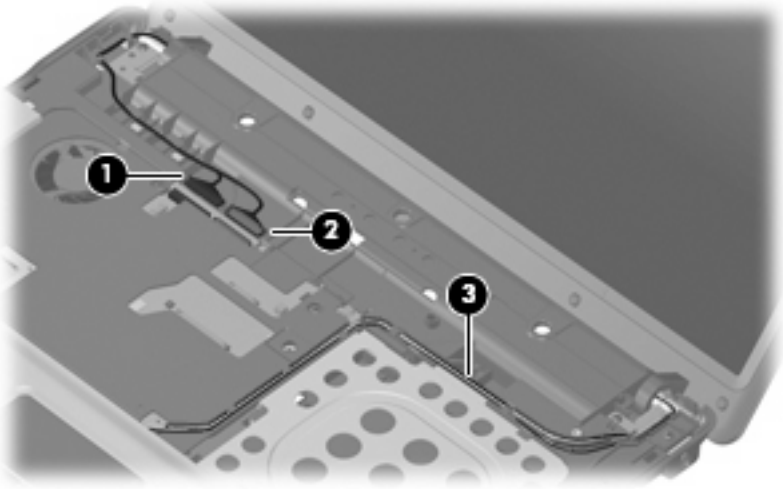
Description	Spare part number
15.4-inch, WXGA with BrightView	456802-001
15.4-inch, WXGA	456801-001

Before removing the display assembly, follow these steps:

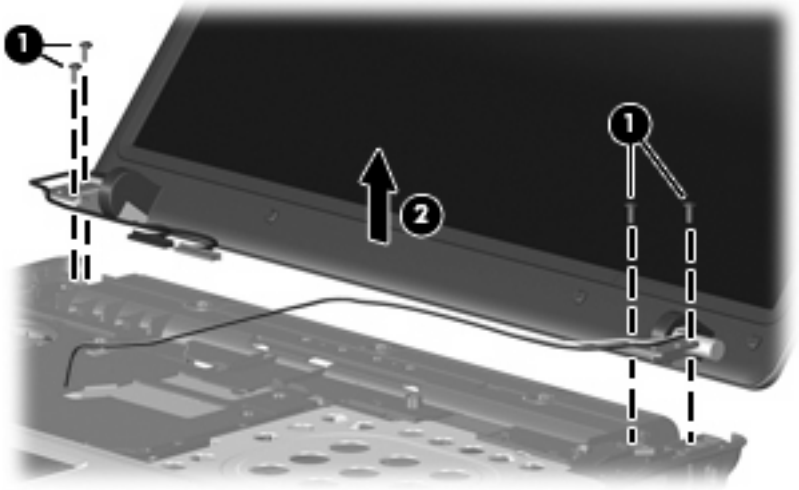
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Disconnect the wireless antenna cables from the WLAN module (see WLAN module on page 40).
6. Remove the following components:
   a. Keyboard (see Keyboard on page 46)
   b. Switch cover (see Switch cover on page 48)
   c. Speaker (see Speaker on page 50)
   d. Display lid switch module (see Display lid switch module on page 51)

Remove the display assembly:

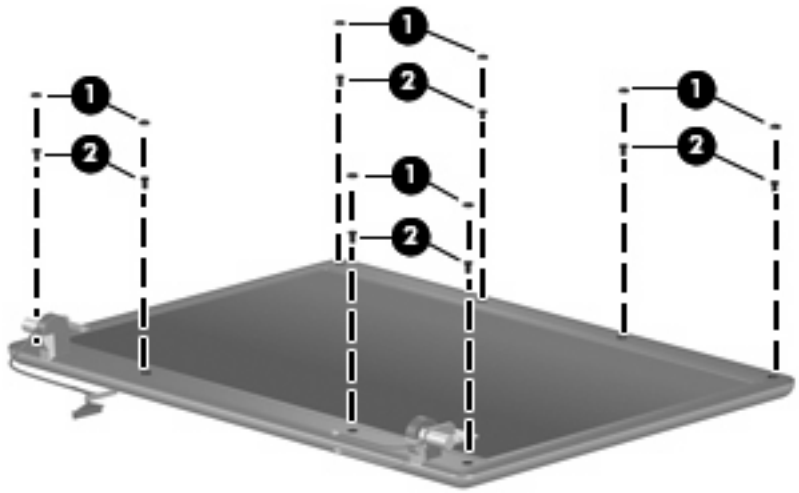
1. Disconnect the display panel cables **(1)** and **(2)** from the system board.
2. Remove the wireless antenna cables **(3)** from the clips and routing channels built into the top cover.



3. Remove the four Torx T8M2.5×7.0 screws **(1)** that secure the display assembly to the computer.
4. Lift the display assembly **(2)** straight up and remove it.

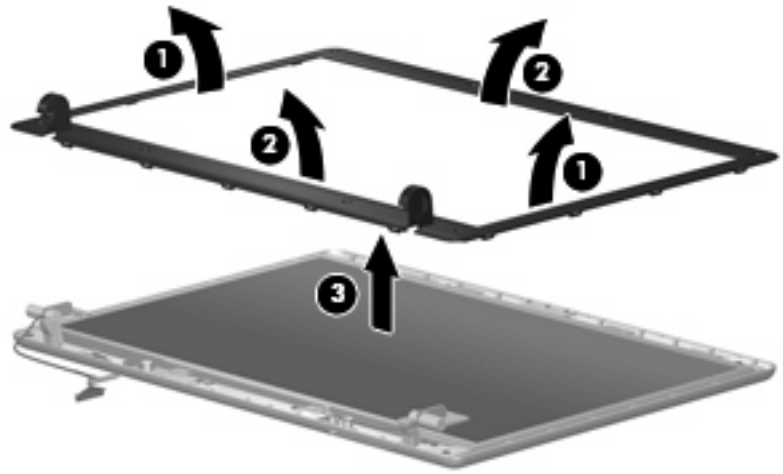


5. If it is necessary to replace the display bezel, display inverter, or display hinges, remove the eight rubber screw covers **(1)** and the eight Torx T8M2.5×6.0 screws **(2)** that secure the display bezel to the display assembly. The rubber screw covers are available in the Rubber Kit, spare part number 456616-001.



6. Flex the inside edges of the left and right sides **(1)** and the top and bottom sides **(2)** of the display bezel until the bezel disengages from the display enclosure.

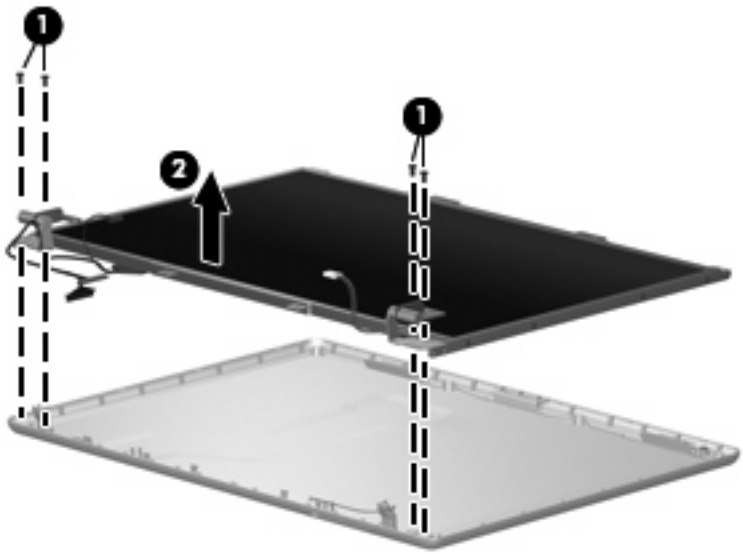
7. Remove the display bezel **(3)**. The display bezel is available using spare part number 456807-001.



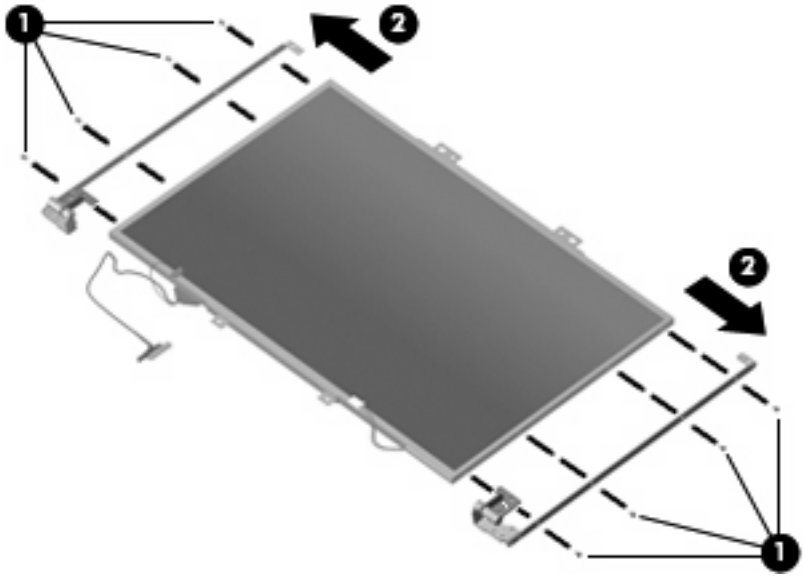
8. If it is necessary to replace the display inverter, remove the inverter **(1)** from the display enclosure as far as the display panel cable and the backlight cable will allow.
9. Disconnect the display panel cable **(2)** and the backlight cable **(3)** from the display inverter.

10. Remove the display inverter. The display inverter is available using spare part number 456618-001.
11. If it is necessary to replace the display hinges, remove the four Torx T8M2.5×6.0 screws **(1)** that secure the display panel to the display enclosure.

12. Remove the display panel **(2)**.



13. Remove the four Phillips PM2.0×4.0 screws **(1)** that secure each display hinge to the display panel.
14. Remove the display hinges **(2)**. The left and right display hinges are available using spare part number 456806-001.



Reverse this procedure to reassemble and install the display assembly.

Top cover

Description	Spare part number
Top cover	456803-001

Before removing the top cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)

Remove the top cover:

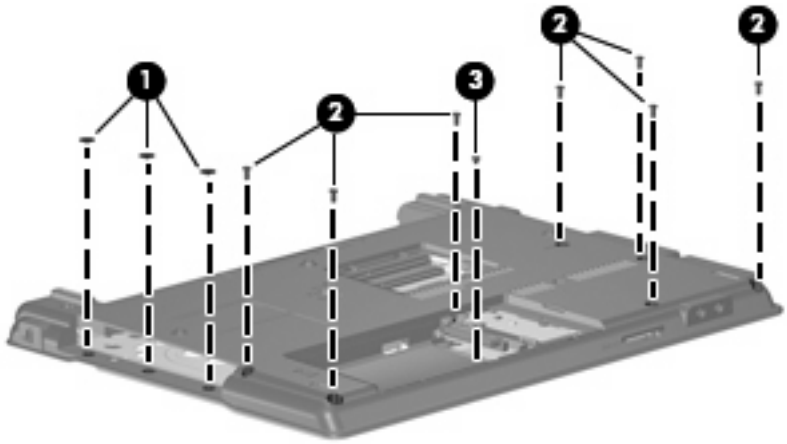
1. Turn the computer upside down, with the front toward you.

2. Remove the followng screws:

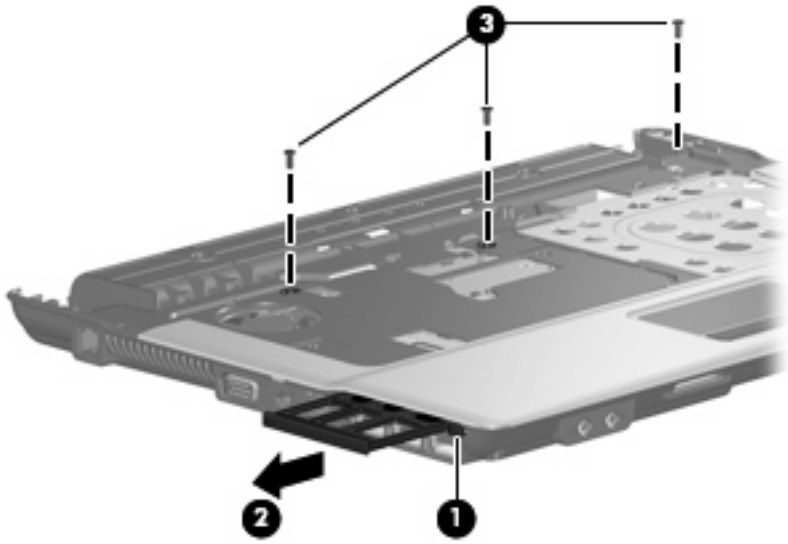
   (1) Three Phillips PM2.0×2.0 broad-head screws

   (2) Seven Torx T8M2.5×7.0 screws

   (3) One Torx T8m2.5×4.0 screw

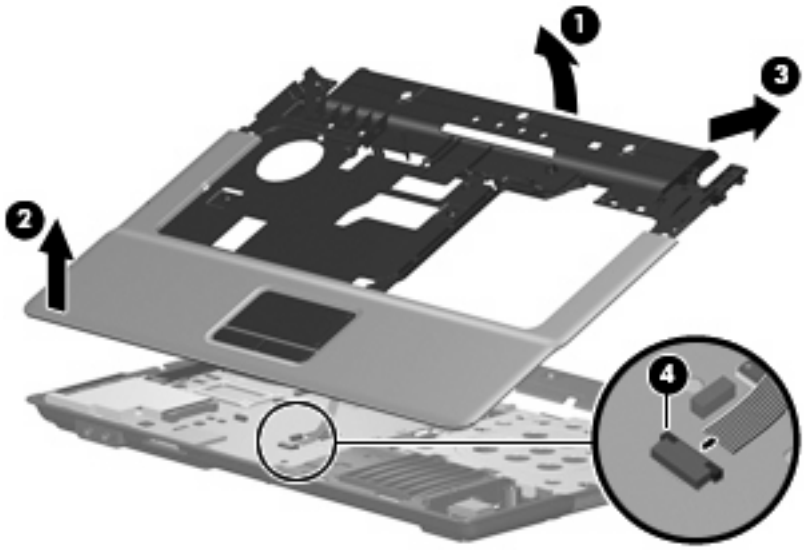


3. Turn the computer right-side up, with the left side toward you.
4. Press in on the ExpressCard slot eject button **(1)** two times. The first press releases the ExpressCard slot eject button. The second press releases the ExpressCard slot bezel from the ExpressCard slot.
5. Remove the ExpressCard slot bezel **(2)**.
6. Remove the three Torx T8M2.5×7.0 screws **(3)** that secure the top cover to the computer.



7. Lift the rear edge of the top cover **(1)** and swing it up and forward until it rests at an angle.
8. Lift the front edge of the top cover **(2)** until it disengages from the base enclosure.
9. Tilt the top cover **(3)** back until the TouchPad cable is accessible.

10. Release the ZIF connector **(4)** to which the TouchPad cable is connected and disconnect the TouchPad cable from the system board.



11. Remove the top cover.

Reverse this procedure to install the top cover.

TouchPad board and TouchPad button board

Description	Spare part number
TouchPad board (includes cable)	456600-001
TouchPad button board (includes cable)	456601-001
TouchPad Miscellaneous Kit (includes TouchPad bracket and TouchPad button board actuators)	456622-001

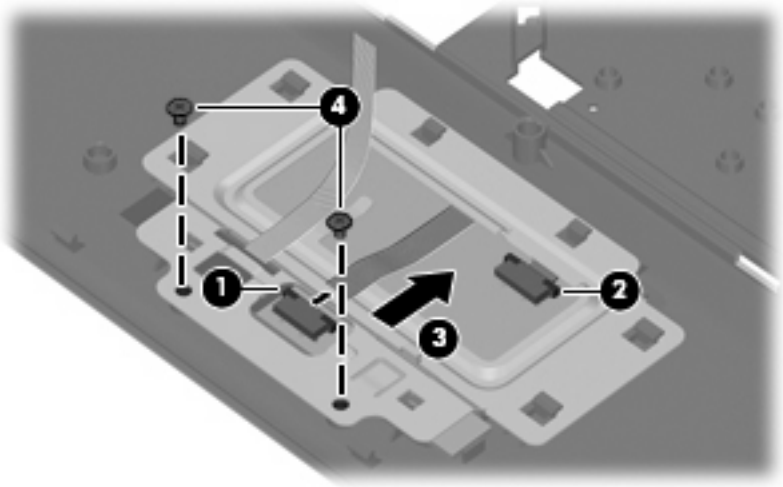
Before removing the TouchPad board and TouchPad button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)
   h. Top cover (see Top cover on page 56)

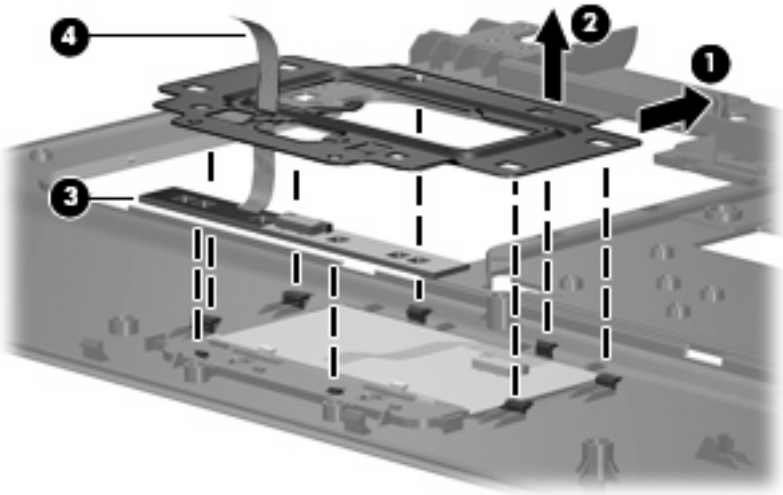
Remove the TouchPad board and TouchPad button board:

1. Turn the top cover upside down, with the front toward you.
2. Release the ZIF connectors on the TouchPad button board **(1)** and TouchPad board **(2)** to which the TouchPad board cable is connected.
3. Disconnect and remove the TouchPad board cable **(3)**.

4. Remove the two Phillips PM2.0×4.0 screws **(4)** that secure the TouchPad bracket to the computer.

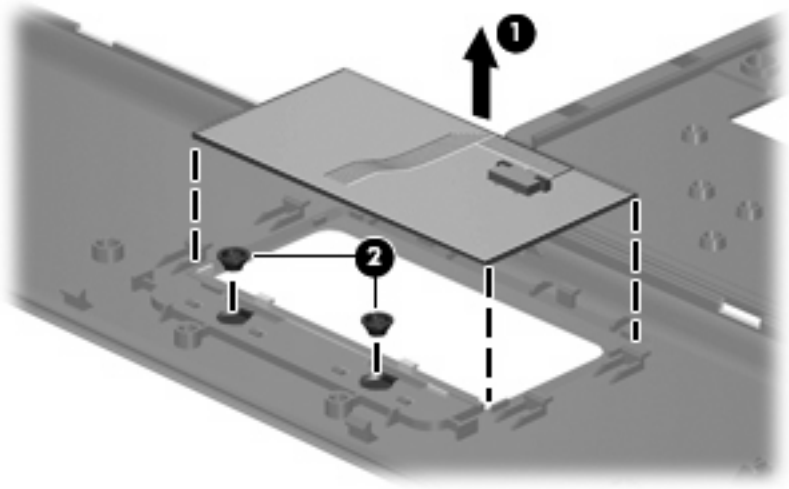


5. Release the TouchPad bracket **(1)** by sliding it back.
6. Remove the TouchPad bracket **(2)** by lifting it straight up.
7. Remove the TouchPad button board **(3)**.
8. Remove the TouchPad button board cable **(4)** from the opening in the TouchPad bracket.



9. Remove the TouchPad board **(1)** from the top cover.

NOTE: When replacing the TouchPad board and TouchPad button board, be sure the TouchPad button actuators **(2)** are installed in the top cover.



Reverse this procedure to install the TouchPad board and TouchPad button board.

Bluetooth module

NOTE: The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 456594-001.

Description	Spare part number
For use in all countries and regions except Japan and Asia Pacific countries and regions	398393-001
For use only Japan and Asia Pacific countries and regions	450066-001

Before removing the Bluetooth module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)

e. Speaker (see Speaker on page 50)

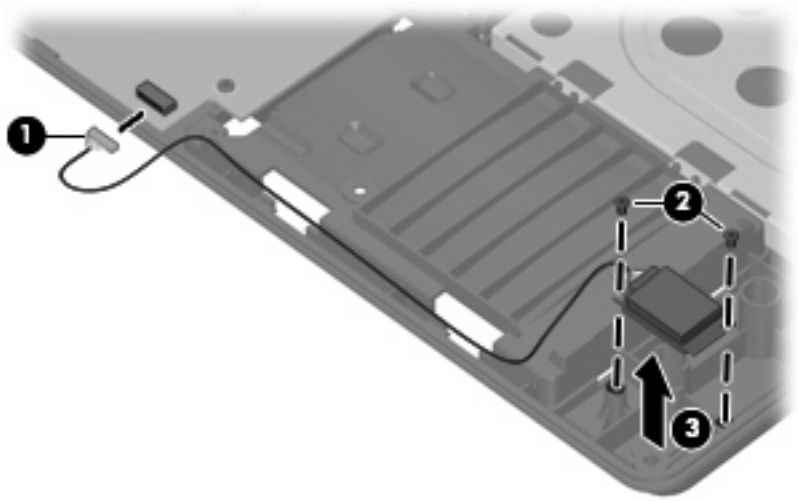
f. Display lid switch module (see Display lid switch module on page 51)

g. Display assembly (see Display assembly on page 52)

h. Top cover (see Top cover on page 56)

Remove the Bluetooth module:

1. Disconnect the Bluetooth module cable **(1)** from the system board.
2. Remove the two Phillips PM2.0×4.0 screws **(2)** that secure the Bluetooth module to the base enclosure.
3. Remove the Bluetooth module **(3)** from the base enclosure.



Reverse this procedure to install the Bluetooth module.

System board

NOTE: All system board spare part kits include replacement thermal material.

Description	Spare part number
For use only with computer models equipped with Intel Core 2 Duo processors	456608-001
For use only with computer models equipped with Intel Celeron M processors	456609-001

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

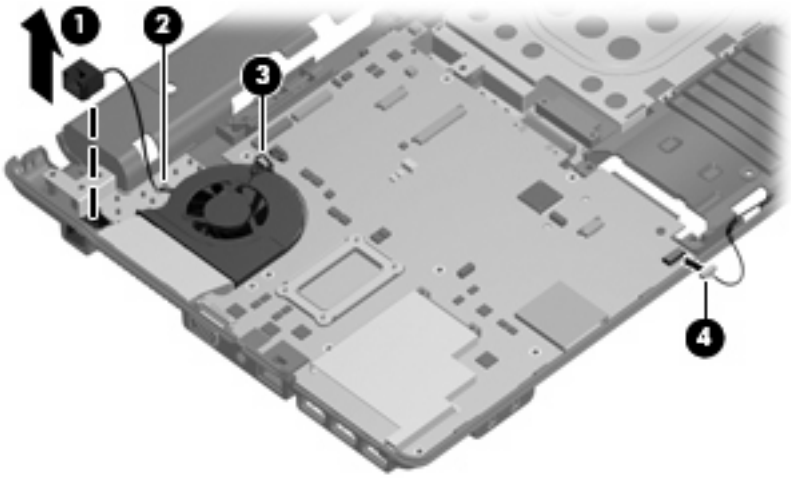
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)
   h. Top cover (see Top cover on page 56)

When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory module (see Memory module on page 43)
- WLAN module (see WLAN module on page 40)
- Processor (see Processor on page 70)
- ExpressCard assembly (see ExpressCard assembly on page 75)

Remove the system board:

1. Remove the RJ-11 jack **(1)** from the clip built into the base enclosure and remove the RJ-11 jack cable from the hook **(2)** built into the base enclosure.
2. Disconnect the fan cable **(3)** and the Bluetooth module cable **(4)** from the system board.

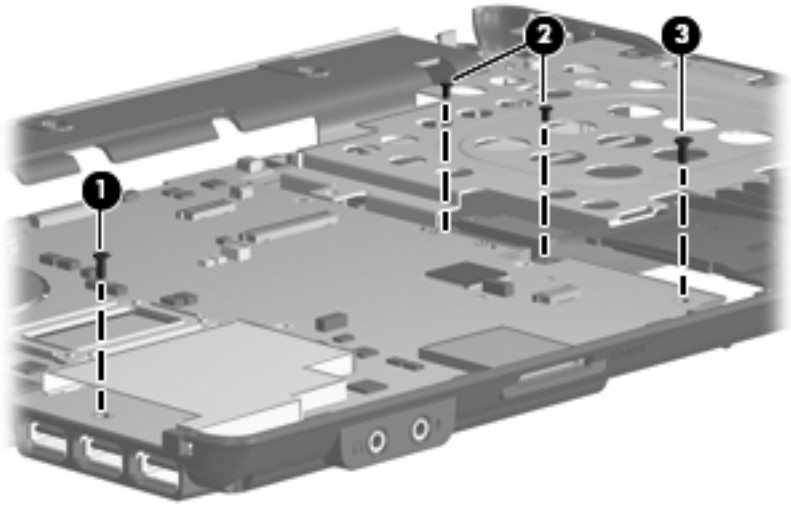


3. Remove the following screws:

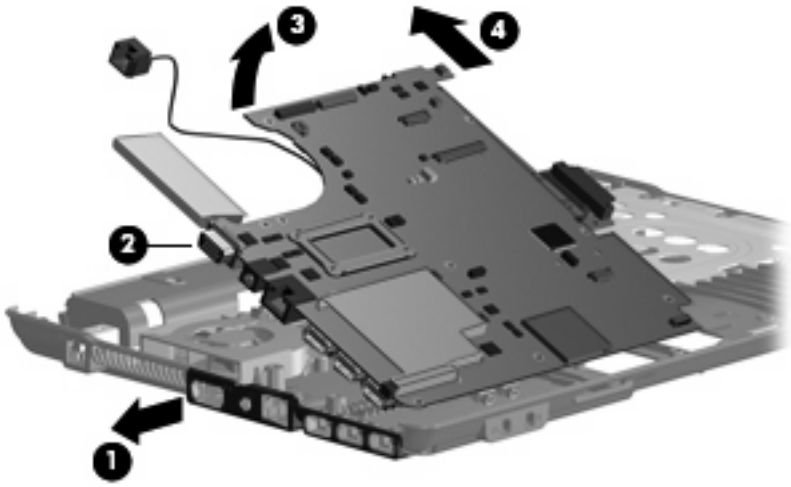
   (1) One Phillips PM2.0×6.0 screw

   (2) Two Torx T8M2.0×4.0 screws

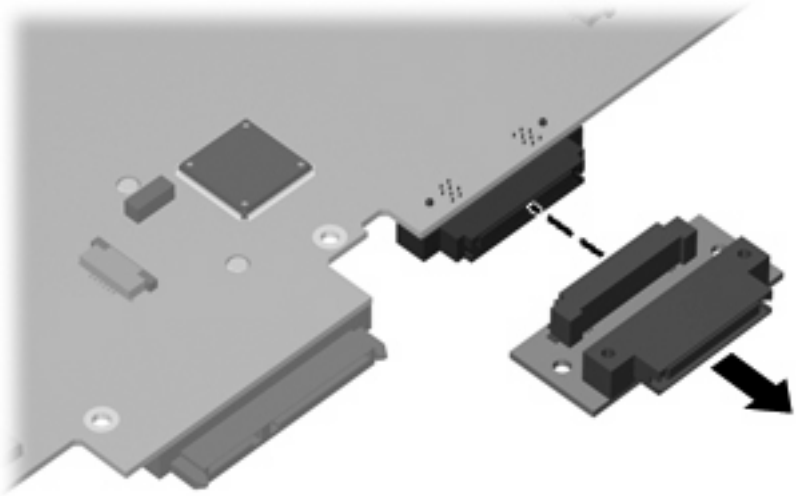
   (3) One Torx T8M2.5×4.0 screw



4. Flex the left side of the base enclosure **(1)** until the external monitor connector **(2)** is clear of the opening in the base enclosure.
5. Lift the rear edge of the system board **(3)** until it rests at an angle.
6. Remove the system board **(4)** from the base enclosure by sliding it back.



7. If it is necessary to replace the optical drive connector board, remove it from the connector on the system board. The optical drive connector board is available using spare part number 456805-001.



Reverse the preceding procedure to install the system board.

Fan

Description	Spare part number
Fan	456604-001

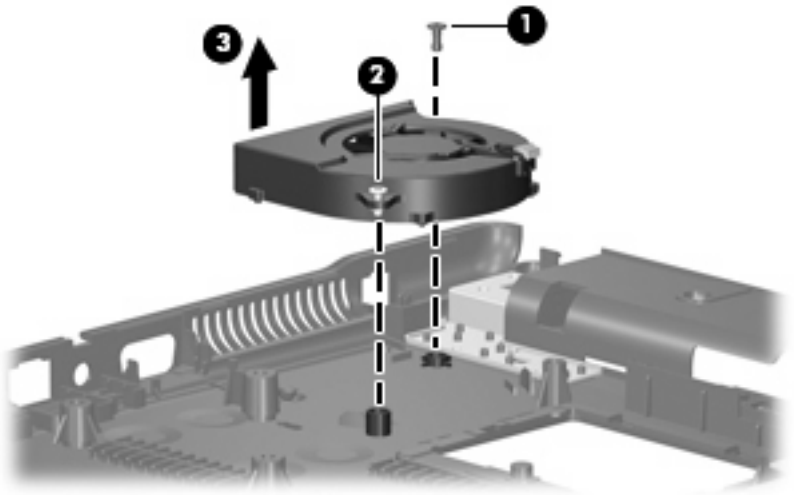
Before removing the fan, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)
   h. Top cover (see Top cover on page 56)
   i. System board (see System board on page 62)

Remove the fan:

1. Remove the Phillips PM2.5×7.0 screw **(1)** that secures the fan to the base enclosure.
2. Loosen the Phillips PM2.5×7.0 screw **(2)** that secures the fan to the base enclosure.

3. Remove the fan **(3)** from the base enclosure.



Reverse this procedure to install the fan.

NOTE: To properly ventilate the computer, allow at least a 7.6-cm (3-inch) clearance on the left side of the computer.

The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

Heat sink

Description	Spare part number
Heat sink (includes replacement thermal material)	456605-001

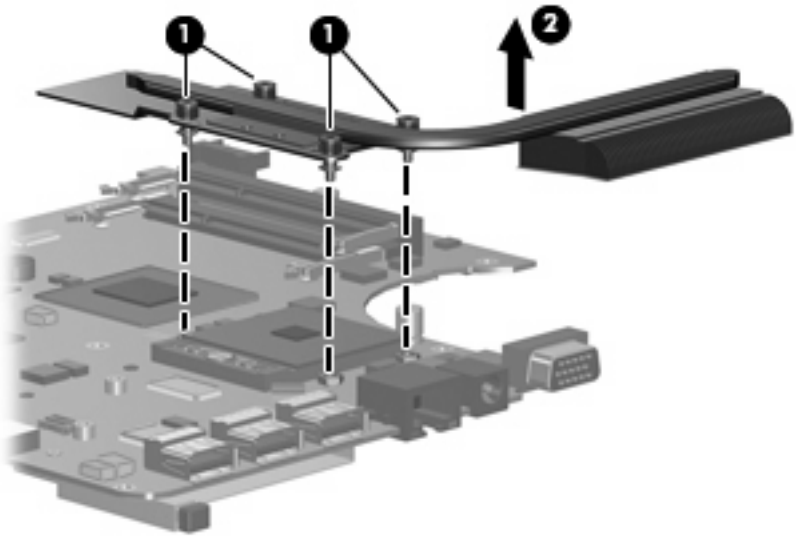
Before removing the heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)
   h. Top cover (see Top cover on page 56)
   i. System board (see System board on page 62)

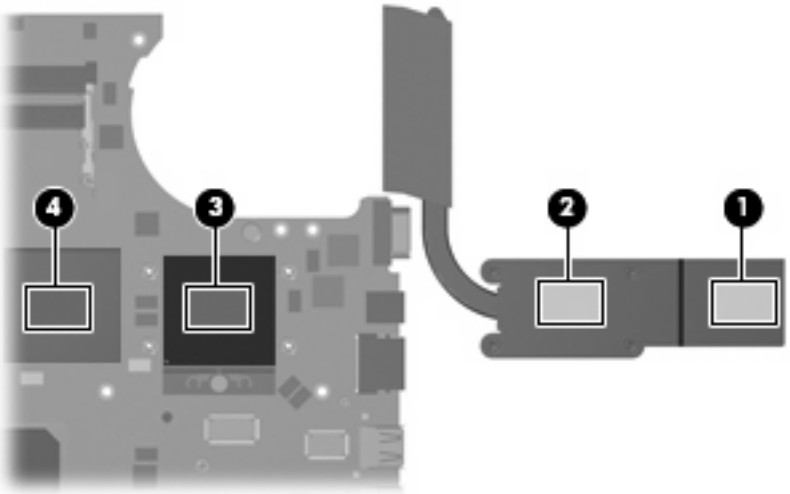
Remove the heat sink:

1. Turn the system board upside down, with the USB connectors toward you.
2. In the 1, 2, 3, 4 sequence stamped into the heat sink, loosen the four Phillips PM2.5×10.0 screws **(1)** that secure the heat sink to the system board.

3. Remove the heat sink **(2)**.



NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink **(1)** and **(2)**, the processor **(3)**, and graphics system component **(4)** each time the heat sink is removed. Thermal material is included with all heat sink and processor spare part kits.



Reverse this procedure to install the heat sink.

Processor

NOTE: All processor spare part kits include replacement thermal material.

Description	Spare part number
Intel Core 2 Duo processors:	
• T7700 2.40-GHz processor (4-MB L2 cache, 800-MHz FSB)	446894-001
• T7500 2.20-GHz processor (4-MB L2 cache, 800-MHz FSB)	446893-001
• T7300 2.00-GHz processor (4-MB L2 cache, 800-MHz FSB)	446892-001
• T7100 1.80-GHz processor (2-MB L2 cache, 800-MHz FSB)	446891-001
• T5450 1.67-GHz processor (2-MB L2 cache, 800-MHz FSB)	454598-001
Intel Celeron M processors:	
• 550 2.00-GHz processor (1-MB L2 cache, 533-MHz FSB)	446889-001
• 540 1.86-GHz processor (1-MB L2 cache, 533-MHz FSB)	446888-001

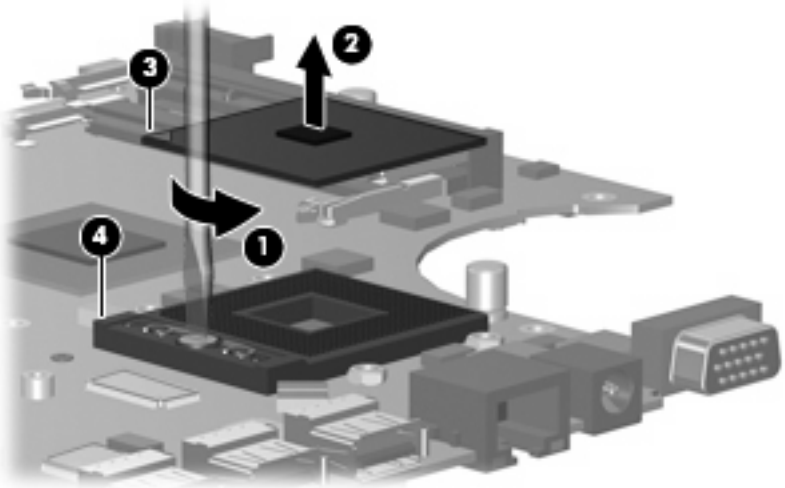
Before removing the processor, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)
   h. Top cover (see Top cover on page 56)
   i. System board (see System board on page 62)

Remove the processor:

1. Turn the system board upside down, with the USB connectors toward you.
2. Use a flat-bladed screwdriver to turn the processor locking screw **(1)** one-half turn counterclockwise until you hear a click.
3. Lift the processor **(2)** straight up and remove it.

NOTE: When you install the processor, the gold triangle **(3)** on the processor must be aligned with the triangle **(4)** embossed on the processor slot.



Reverse this procedure to install the processor.

Modem module

NOTE: The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 456594-001.

Description	Spare part number
Modem module	441074-001

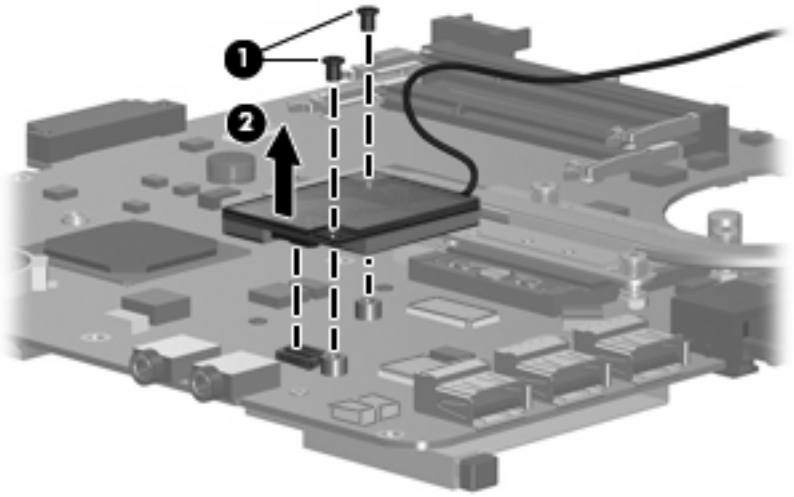
Before removing the modem module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)
   h. Top cover (see Top cover on page 56)
   i. System board (see System board on page 62)

Remove the modem module:

1. Turn the system board upside down, with the USB connectors toward you.
2. Remove the two Phillips PM2.5×4.0 screws **(1)** that secure the modem module to the system board.

3. Lift the modem module **(2)** straight up to disconnect it from the system board.



4. Remove the modem module.

Reverse this procedure to install the modem module.

RTC battery

NOTE: Removing the RTC battery and leaving it uninstalled for 5 or more minutes causes all passwords and CMOS settings to be cleared.

Description	Spare part number
RTC battery	449137-001

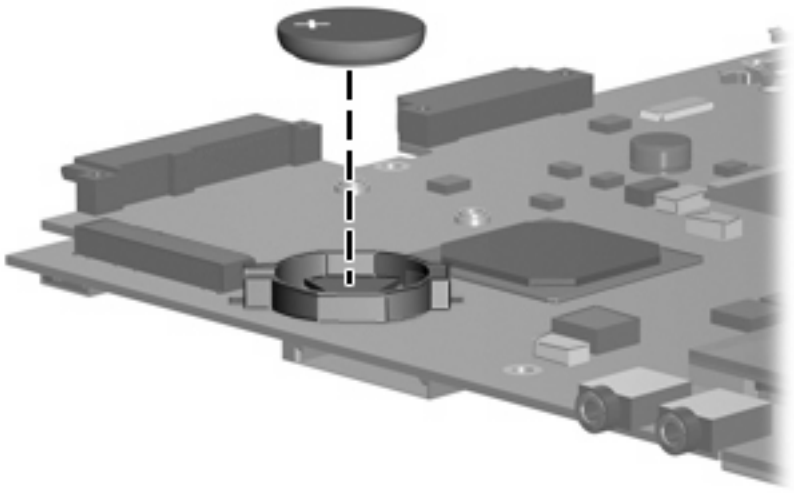
Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)
   h. Top cover (see Top cover on page 56)
   i. System board (see System board on page 62)

Remove the RTC battery:

1. Turn the system board upside down, with the audio connectors toward you.

2. Remove the RTC battery from the socket on the system board.



Reverse this procedure to install the RTC battery.

ExpressCard assembly

Description	Spare part number
ExpressCard assembly	456607-001

Before removing the ExpressCard assembly, follow these steps:

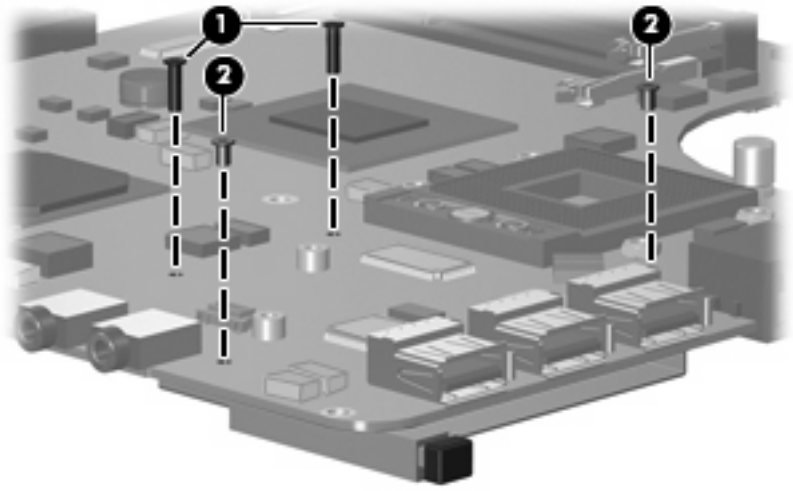
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 37).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 38)
   b. Optical drive (see Optical drive on page 44)
   c. Keyboard (see Keyboard on page 46)
   d. Switch cover (see Switch cover on page 48)
   e. Speaker (see Speaker on page 50)
   f. Display lid switch module (see Display lid switch module on page 51)
   g. Display assembly (see Display assembly on page 52)

h. Top cover (see Top cover on page 56)

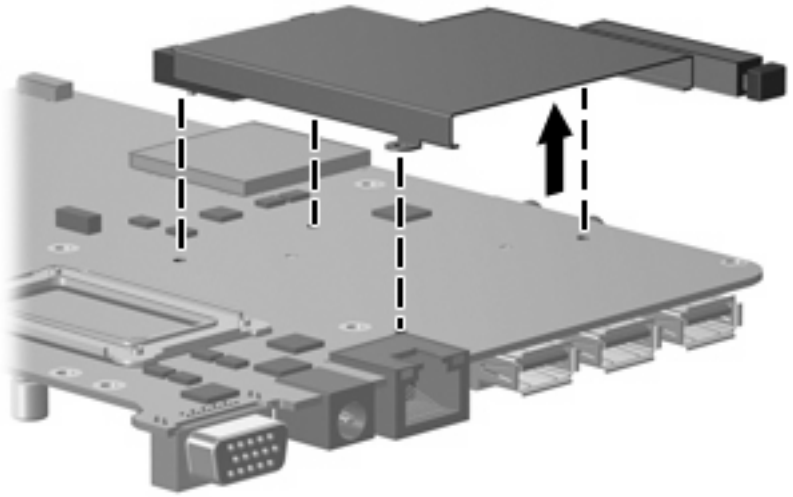
i. System board (see System board on page 62)

Remove the ExpressCard assembly:

1. Turn the system board upside down, with the USB connectors toward you.
2. Remove the two Phillips PM2.0×8.0 screws **(1)** and the two Phillips PM2.0×4.0 screws **(2)** that secure the ExpressCard assembly to the system board.



3. Turn the system board right-side up, with the USB connectors toward you.
4. Remove the ExpressCard assembly from the system board.



Reverse this procedure to install the ExpressCard assembly.

5 Computer Setup

Starting Computer Setup

Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load.

NOTE: Some of the Computer Setup menu items listed in this guide may not be supported by your computer.

NOTE: Pointing devices are not supported in Computer Setup. You must use the keyboard to navigate and make selections.

NOTE: An external keyboard connected by USB can be used with Computer Setup only if USB legacy support is enabled.

To start Computer Setup:

1. Turn on or restart the computer.
2. Before Windows® opens and while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen, press f10.

Using Computer Setup

Navigating and selecting in Computer Setup

The information and settings in Computer Setup are accessed from the File, Security, Diagnostics, and System Configuration menus.

1. Open Computer Setup by turning on or restarting the computer, and then pressing f10 while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.

   Because Computer Setup is not Windows-based, it does not support the TouchPad. Navigation and selection are by keystroke:

   - To choose a menu or a menu item, use the arrow keys.
   - To select an item, press enter.
   - To close open dialog boxes and return to the main Computer Setup screen, press esc.
   - To view navigation information, press f1.
   - To change the language, press f2.

2. Select the **File, Security, Diagnostics,** or **System Configuration** menu.

3. To exit Computer Setup, choose one of the following methods:

   - To exit Computer Setup without saving your preferences, use the arrow keys to select **File > Ignore Changes and Exit**. Then follow the instructions on the screen.
   - To save your preferences and exit Computer Setup, use the arrow keys to select **File > Save Changes and Exit**. Then follow the instructions on the screen.

Your preferences go into effect when the computer restarts.

Restoring factory settings in Computer Setup

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Open Computer Setup by turning on or restarting the computer, and then pressing f10 while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.
2. Use the arrow keys to select **File > Restore** defaults, and then press enter.
3. When the confirmation dialog box opens, press f10.
4. To save your preferences and exit Computer Setup, use the arrow keys to select **File > Save Changes and Exit**. Then follow the instructions on the screen.

Your preferences go into effect when the computer restarts.

NOTE: Your password settings and security settings are not changed when you restore the factory settings.

Computer Setup menus

The menu tables in this section provide an overview of Computer Setup options.

NOTE: Some of the Computer Setup menu items listed in this chapter may not be supported by your computer.

File menu

Select	To do this
System information	• View identification information for the computer and the batteries in the system. • View specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version.
Restore defaults	Replace the configuration settings in Computer Setup with the original factory settings. (Password settings and security settings are not changed when you restore the factory settings.)
Ignore changes and exit	Cancel any changes entered during the current session. Then exit and restart the computer.
Save changes and exit	Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts.

Security menu

Select	To do this
Setup password	Enter, change, or delete a setup password.
Power-On password	Enter, change, or delete a power-on password.
Password options	• Enable/disable stringent security. • Enable/disable password requirement on computer restart.
DriveLock passwords	• Enable/disable DriveLock on any computer hard drive. • Change a DriveLock user password or master password. **NOTE:** DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Smart Card security	Enable/disable support for smart card and Java™ Card power-on authentication. **NOTE:** Power-on authentication for smart cards is supported only on computers with optional smart card readers. **NOTE:** You must have an administrator password to change this setting.
TPM Embedded Security	Enable/disable support for Trusted Platform Module (TPM) Embedded Security, which protects the computer from unauthorized access to owner functions available in Embedded Security for ProtectTools. For more information, refer to the ProtectTools software Help. **NOTE:** You must have a setup password to change this setting.
System IDs	Enter user-defined computer asset tracking number and ownership tag.
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive. The following options are available: • Fast: Runs the Disk Sanitizer erase cycle once. • Optimum: Runs the Disk Sanitizer erase cycle 3 times. • Custom: Allows you to select the desired number of Disk Sanitizer erase cycles from a list. **CAUTION:** If you run Disk Sanitizer, the data on the primary hard drive is destroyed permanently.

Diagnostics menu

Select	To do this
Hard Drive Self-Test options	Run a comprehensive self-test on any hard drive in the system.
Memory Check	Run a comprehensive check on system memory.
Startup Check (select models only)	Verify the system components needed for starting the computer.

System Configuration menu

NOTE: Some of the listed System Configuration options may not be supported by your computer.

Select	To do this
Language (or press f2)	Change the Computer Setup language.
Boot options	• Set f9, f10, and f12 delay when starting up. • Enable/disable CD-ROM boot. • Enable/disable floppy boot. • Enable/disable internal network adapter boot and set the boot mode (PXE or RPL). • Enable/disable MultiBoot, which sets a boot order that can include most boot devices in the system. • Set the Express Boot Popup delay in seconds. • Set the boot order.
Device configurations	• Swap the functions of the fn key and left ctrl key. • Enable/disable multiple standard pointing devices at startup. (To set the computer to support only a single, usually nonstandard, pointing device at startup, select **Disable**.) • Enable/disable USB legacy support. When enabled, USB legacy support allows the following: ◦ Use of a USB keyboard, mouse, and hub in Computer Setup even when a Windows operating system is not running. ◦ Startup from bootable USB devices, including a hard drive, diskette drive, or optical drive connected by a USB port to the computer or to an optional docking device (select models only). • Select a parallel port mode: EPP (Enhanced Parallel Port), standard, bidirectional, or ECP (Enhanced Capabilities Port). • Enable/disable BIOS DMA data transfers. • Enable/disable fan always on while connected to an AC outlet. • Enable/disable Intel® Data Execution Prevention or AMD® PSAE Execution Disable. When enabled, the processor can disable some virus code execution, which helps to improve computer security. • Enable/disable LAN Power Save. When enabled, saves power by turning off the LAN when not in use. • Enable/disable SATA Native Mode. • Enable/disable Dual Core CPU. • Enable/disable Secondary Battery Fast Charge. • Choose Bit-shift or LBA assisted HDD Translation Mode. • Enable/disable Windows direct application launcher. • Enable/disable HP Lockout.

Select	To do this
Built-In Device Options	• Enable/disable embedded WWAN Device Radio. • Enable/disable embedded WLAN Device Radio. • Enable/disable embedded Bluetooth® Device Radio. • Enable/disable LAN/WLAN Switching. When enabled, switches to a WLAN when a LAN is either unavailable or disconnected. • Enable/disable Wake on LAN from Off. • Enable/disable the ambient light sensor.
Port Options	• Enable/disable the serial port. • Enable/disable the parallel port. • Enable/disable the flash media reader. • Enable/disable the USB port. **CAUTION:** Disabling the USB port also disables MultiBay II devices and ExpressCard devices on the advanced port replicator. • Enable/disable the 1394 port. • Enable/disable the cardbus slot. • Enable/disable the ExpressCard slot. • Enable/disable the infrared port. • Enable/disable the optical disk drive. • Enable/disable the network controller.

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Length	26.68 cm	10.50 in
Width	35.80 cm	14.10 in
Height (front to rear)	3.23 to 3.58 cm	1.27 to 1.41 in
Weight (equipped with optical drive, hard drive, and battery)	2.45 kg	5.4 lbs
Input power		
Operating voltage	19.0 V dc @ 4.74 A – 90 W	
Operating current	4.74 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	

	Metric	U.S.
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	

NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.

15.4-inch, WXGA display specifications

	Metric	U.S.
Dimensions		
Height	20.7 cm	8.15 in
Width	33.1 cm	13.03 in
Diagonal	39.1 cm	15.39 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1 (typical)	
Brightness	180 nits (typical)	
Pixel resolution		
Pitch	0.197 × 0.197 mm	
Format	1366 × 768	
Configuration	RGB vertical stripe	
Backlight	CCFT	
Character display	80 × 25	
Total power consumption	7.0 W	
Viewing angle	+/-40 horizontal, +/–50° vertical (typical)	

Hard drive specifications

	160-GB*	120-GB*	80-GB*
Dimensions			
Height	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm
Weight	101 g	101 g	101 g
Interface type	SATA	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)			
Single track	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms
Logical blocks	312,560,640	234,420,480	156,280,320
Disc rotational speed	5400 rpm	5400 rpm	5400 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)		

*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

NOTE: Certain restrictions and exclusions apply. Contact technical support for details.

DVD±RW and CD-RW Double-Layer Combo Drive specifications

Applicable disc	**Read:**	**Write:**
	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
Access time	**CD**	**DVD**
Random	< 175 ms	< 230 ms
Full stroke	< 285 ms	< 335 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD-ROM	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA Mode	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

DVD/CD-RW Combo Drive specifications

Applicable disc	**Read:**	**Write:**
	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	CD-R and CD-RW
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
Access time	**CD**	**DVD**
Random	< 110 ms	< 130 ms
Full stroke	< 210 ms	< 225 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD	3,600 KB/sec	
24X CD-R	3,600 KB/sec	
24X CD-RW	3,600 KB/sec	
Transfer mode	Multiword DMA mode 2	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

System DMA specifications

Hardware DMA	System function
DMA0	Not applicable
DMA1*	Not applicable
DMA2*	Not applicable
DMA3	Not applicable
DMA4	Direct memory access controller
DMA5*	Available for ExpressCard
DMA6	Not assigned
DMA7	Not assigned
*ExpressCard controller can use DMA 1, 2, or 5.	

System interrupt specifications

Hardware IRQ	System function
IRQ0	System timer
IRQ1	Standard 101-/102-Key or Microsoft® Natural Keyboard
IRQ2	Cascaded
IRQ3	Intel 82801DB/DBM USB2 Enhanced Host Controller—24CD
IRQ4	COM1
IRQ5*	Conexant AC—Link Audio Intel 82801DB/DBM SMBus Controller—24C3 Data Fax Modem with SmartCP
IRQ6	Diskette drive
IRQ7*	Parallel port
IRQ8	System CMOS/real-time clock
IRQ9*	Microsoft ACPI-compliant system
IRQ10*	Intel USB UHCI controller—24C2 Intel 82852/82855 GM/GME Graphic Controller Realtek RTL8139 Family PCI Fast Ethernet Controller
IRQ11	Intel USB EHCI controller—24CD Intel USB UHCI controller—24C4 Intel USB UHCI controller—24C7 Intel Pro/Wireless 2200BG TI OHCI 1394 host controller TI PCI1410 CardBus controller
IRQ12	Synaptics PS/2 TouchPad
IRQ13	Numeric data processor
IRQ14	Primary IDE channel
IRQ15	Secondary IDE channel
*Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.	
NOTE: ExpressCards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.	

System I/O address specifications

I/O address (hex)	System function (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 “Super I/O” configuration for CPU
040 - 05F	Counter/timer registers
044 - 05F	Unused
060	Keyboard controller
061	Port B
062 - 063	Unused
064	Keyboard controller
065 - 06F	Unused
070 - 071	NMI enable/RTC
072 - 07F	Unused
080 - 08F	DMA page registers
090 - 091	Unused
092	Port A
093 - 09F	Unused
0A0 - 0A1	Interrupt controller no. 2
I/O Address (hex)	System Function (shipping configuration)
0A2 - 0BF	Unused
0C0 - 0DF	DMA controller no. 2
0E0 - 0EF	Unused
0F0 - 0F1	Coprocessor busy clear/reset
0F2 - 0FF	Unused
100 - 16F	Unused
170 - 177	Secondary fixed disk controller
178 - 1EF	Unused
1F0 - 1F7	Primary fixed disk controller
1F8 - 200	Unused
201	JoyStick (decoded in ESS1688)
202 - 21F	Unused

I/O address (hex)	System function (shipping configuration)
220 - 22F	Entertainment audio
230 - 26D	Unused
26E - 26	Unused
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	Unused
2A8 - 2E7	Unused
2E8 - 2EF	Reserved serial port
2F0 - 2F7	Unused
2F8 - 2FF	Infrared port
300 - 31F	Unused
320 - 36F	Unused
370 - 377	Secondary diskette drive controller
378 - 37F	Parallel port (LPT1/default)
380 - 387	Unused
388 - 38B	FM synthesizer—OPL3
38C - 3AF	Unused
3B0 - 3BB	VGA
3BC - 3BF	Reserved (parallel port/no EPP support)
3C0 - 3DF	VGA
3E0 - 3E1	ExpressCard controller in CPU
3E2 - 3E3	Unused
3E8 - 3EF	Internal modem
3F0 - 3F7	"A" diskette controller
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register (PCIDIVO-1)
CFC - CFF	PCI configuration data register (PCIDIVO-1)

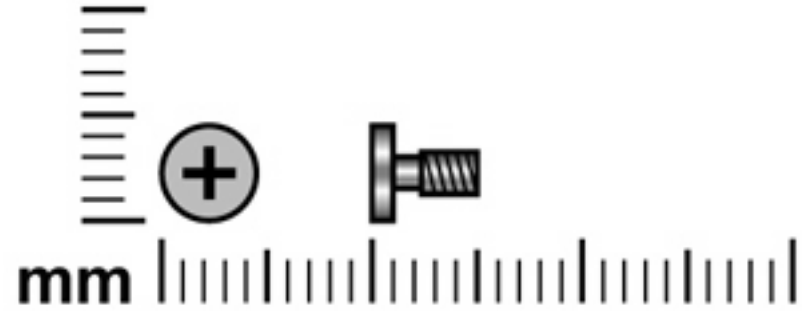
System memory map specifications

Size	Memory address	System function
640 KB	00000000-0009FFFF	Base memory
128 KB	000A0000-000BFFFF	Video memory
48 KB	000C0000-000CBFFF	Video BIOS
160 KB	000C8000-000E7FFF	Unused
64 KB	000E8000-000FFFFF	System BIOS
15 MB	00100000-00FFFFFF	Extended memory
58 MB	04800000-07FFFFFF	Super extended memory
58 MB	04800000-07FFFFFF	Unused
2 MB	08000000-080FFFFF	Video memory (direct access)
4 GB	08200000-FFFEFFFF	Unused
64 KB	FFFF0000-FFFFFFFF	System BIOS

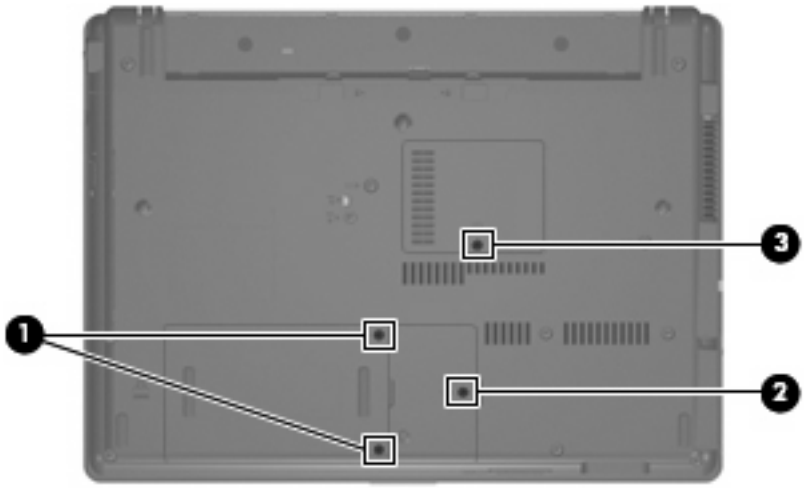
7 Screw listing

This section provides specification and reference information for the screws and screw locks used in the computer. All screws listed in this section are available in the Screw Kit, spare part number 456615-001.

Phillips PM2.0×5.0 captive screw



Color	Quantity	Length	Thread	Head diameter
Black	4	5.0 mm	2.0 mm	5.0 mm



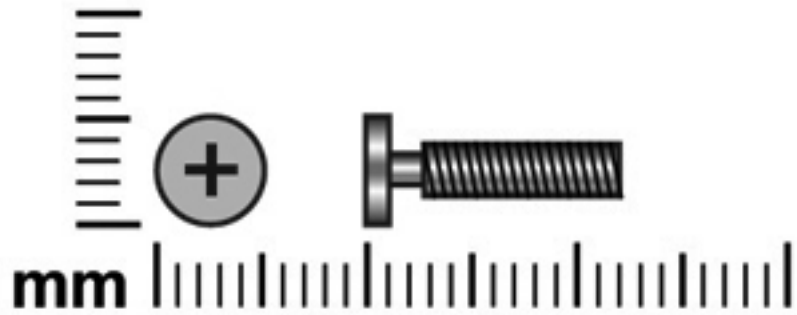
Where used:

(1) Two captive screws that secure the hard drive bay cover to the computer (screws are captured on the cover by C-clips)

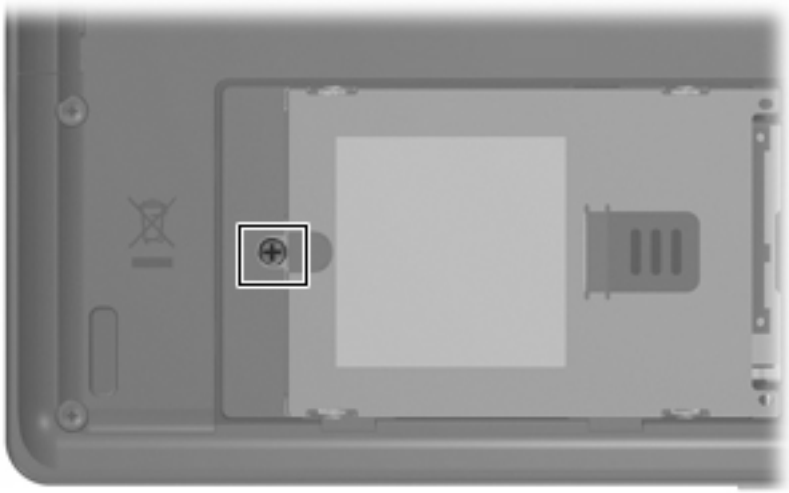
(2) One captive screw that secures the WLAN module compartment cover to the computer (screw is captured on the cover by a C-clip)

(3) One captive screw that secures the memory module compartment cover to the computer (screw is captured on the cover by a C-clip)

Phillips PM2.5×12.0 captive screw

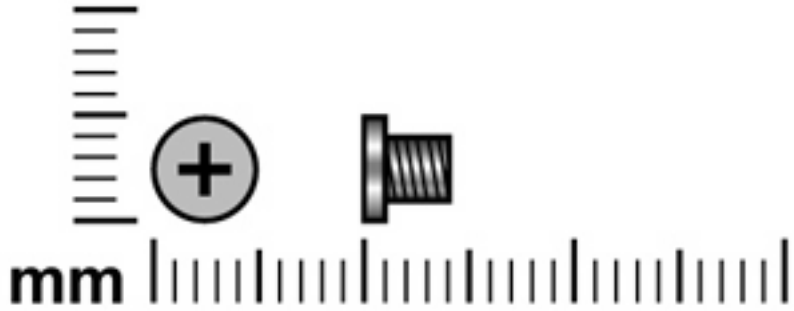


Color	Quantity	Length	Thread	Head diameter
Silver	1	12.0 mm	2.5 mm	5.0 mm

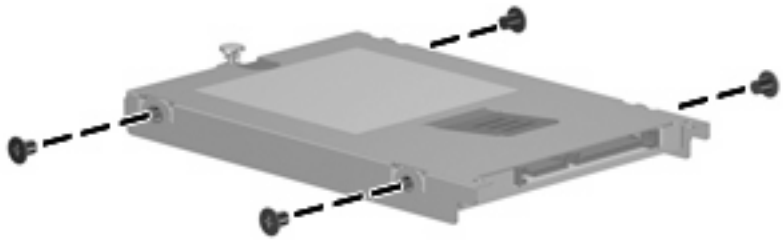


Where used: One captive screw that secures the hard drive to the computer (screw is secured to the hard drive bracket)

Phillips PM3.0×4.0 screw

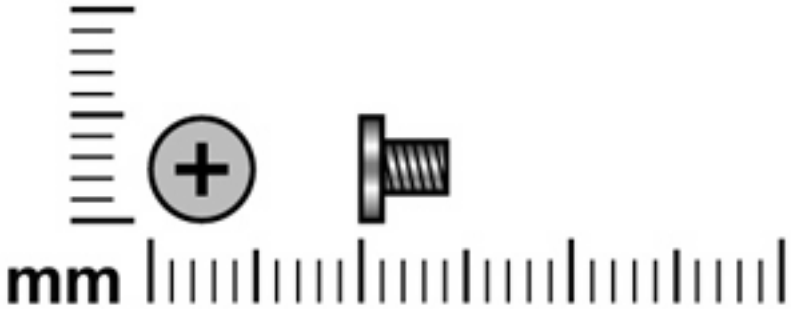


Color	Quantity	Length	Thread	Head diameter
Silver	4	4.0 mm	3.0 mm	5.0 mm

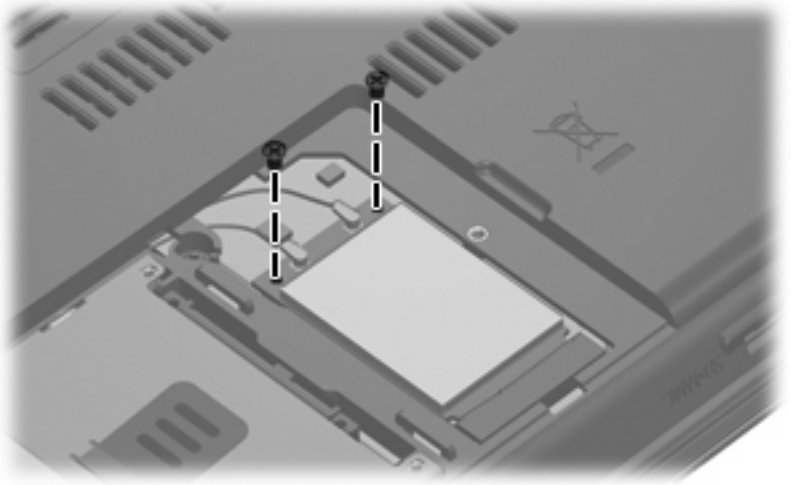


Where used: 4 screws that secure the hard drive bracket to the hard drive

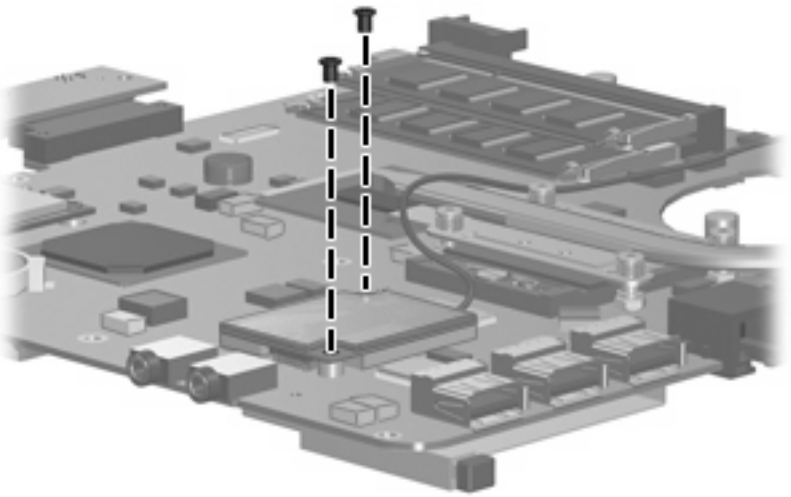
Phillips PM2.5×4.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	4	4.0 mm	2.5 mm	5.0 mm

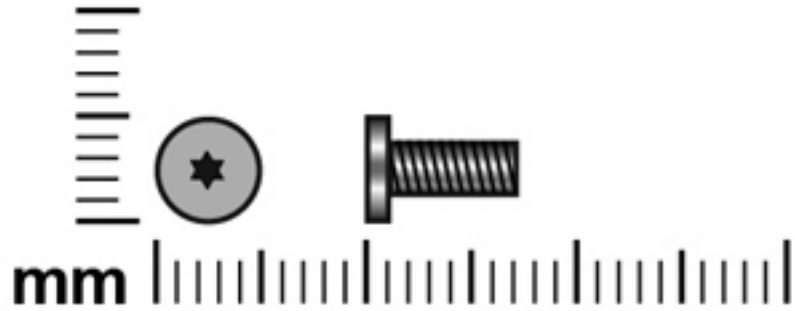


Where used: 2 screws that secure the WLAN module to the system board

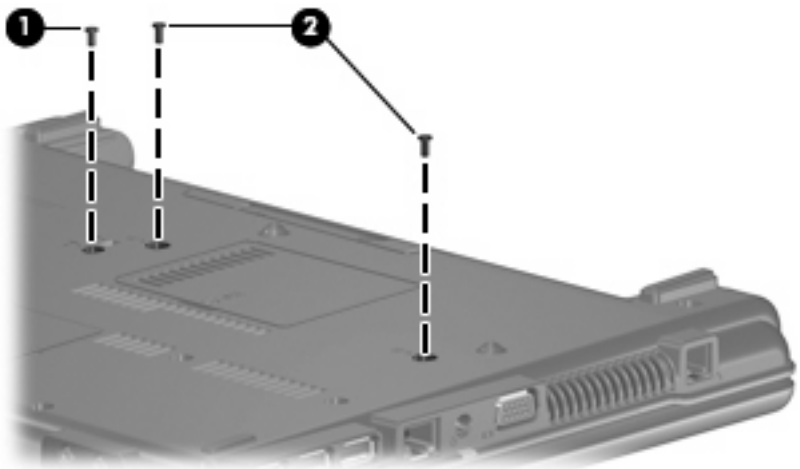


Where used: 2 screws that secure the modem module to the system board

Torx T8M2.5×7.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	17	7.0 mm	2.5 mm	5.0 mm

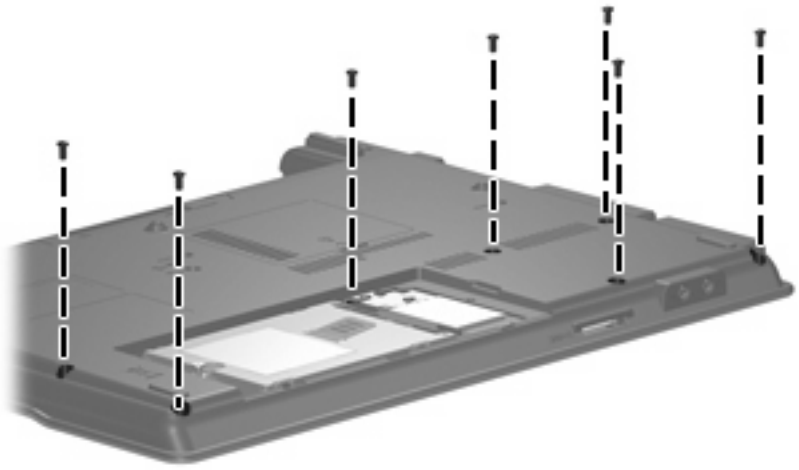


Where used:

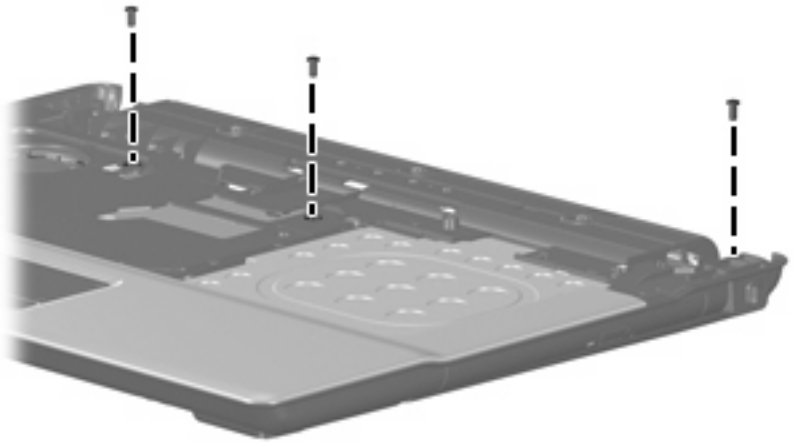
(1) One screw that secures the optical drive to the computer

(2) Two screws that secure the keyboard to the computer

Where used: 4 screws that secure the display assembly to the computer

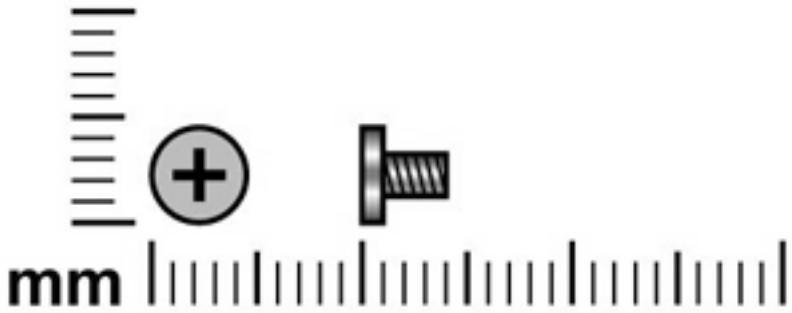


Where used: 7 screws that secure the top cover to the base enclosure



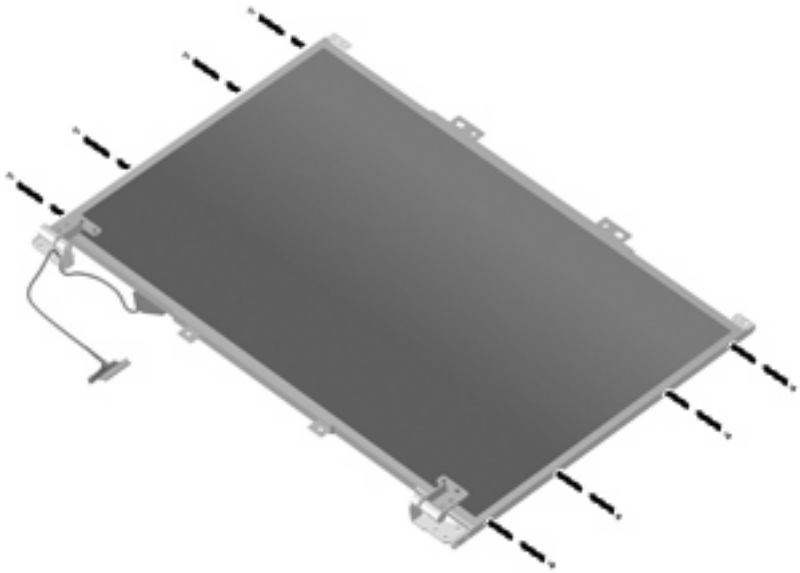
Where used: 3 screws that secure the top cover to the base enclosure

Phillips PM2.0×4.0 screw

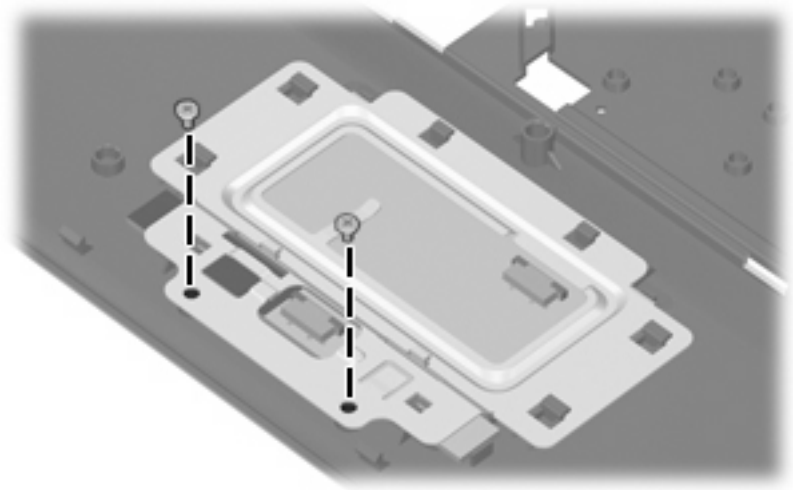


Color	Quantity	Length	Thread	Head diameter
Silver	16	4.0 mm	2.0 mm	4.5 mm

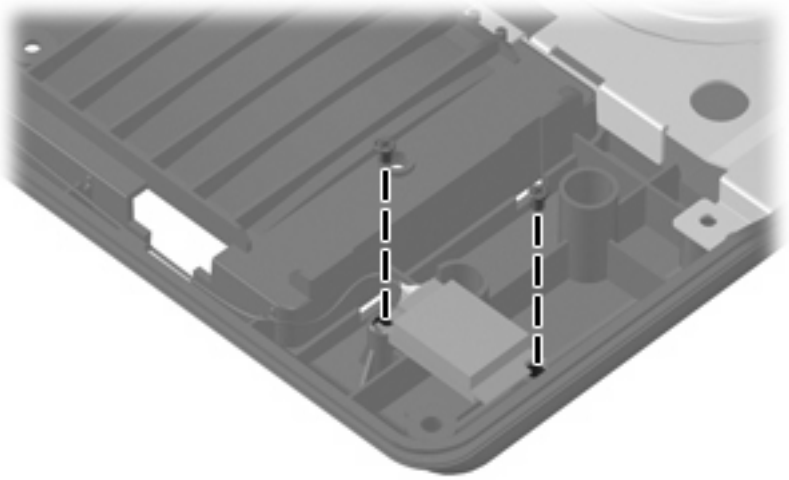
Where used: 2 screws that secure the optical drive bracket to the optical drive



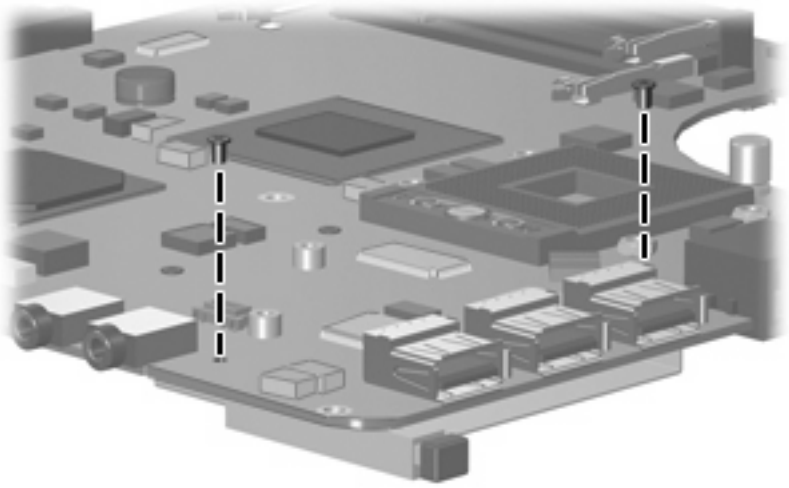
Where used: 8 screws that secure the display hinges to the display assembly



Where used: 2 screws that secure the TouchPad Bracket and TouchPad button board to the top cover

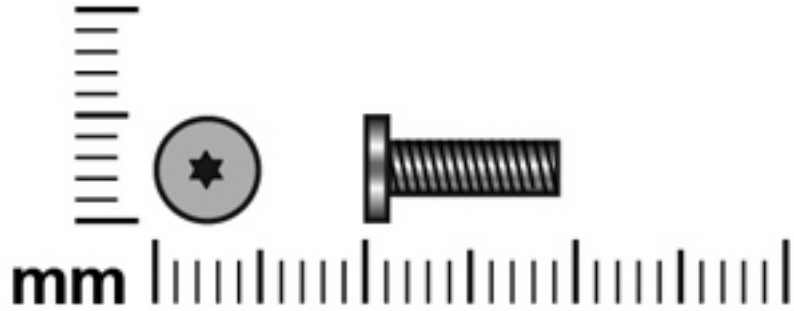


Where used: 2 screws that secure the Blueotooth module to the base enclosure

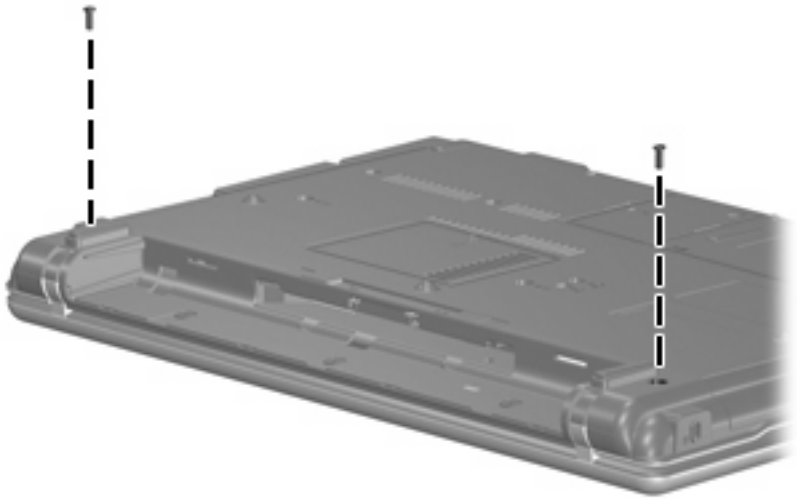


Where used: 2 screws that secure the ExpressCard assembly to the system board

Torx T8M2.5×9.0 screw

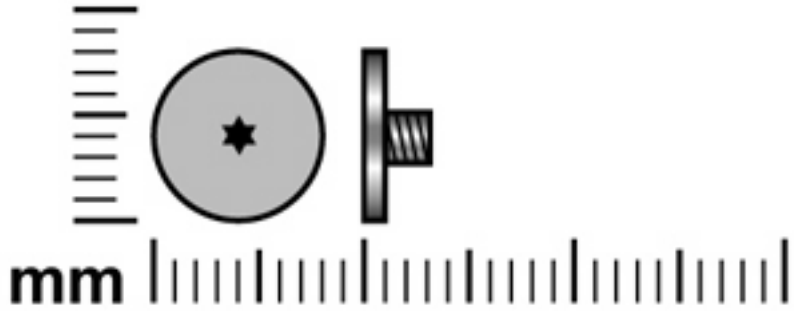


Color	Quantity	Length	Thread	Head diameter
Black	2	9.0 mm	2.5 mm	5.0 mm

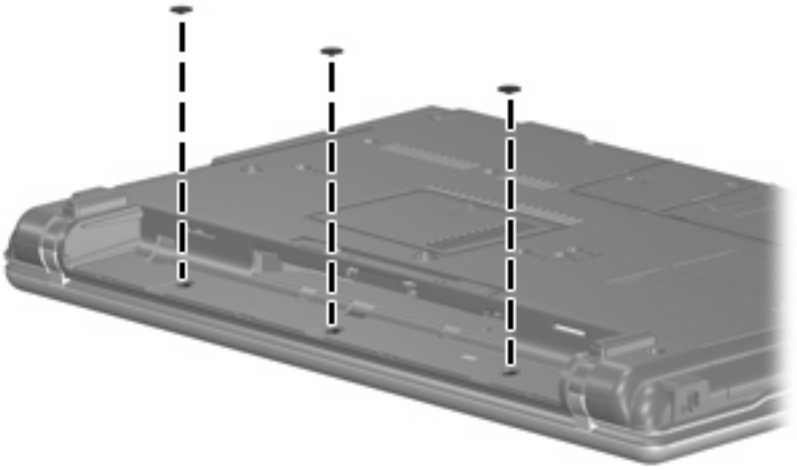


Where used: 2 screws that secure the switch cover to the computer

Torx T8M2.5×3.0 broad-head screw

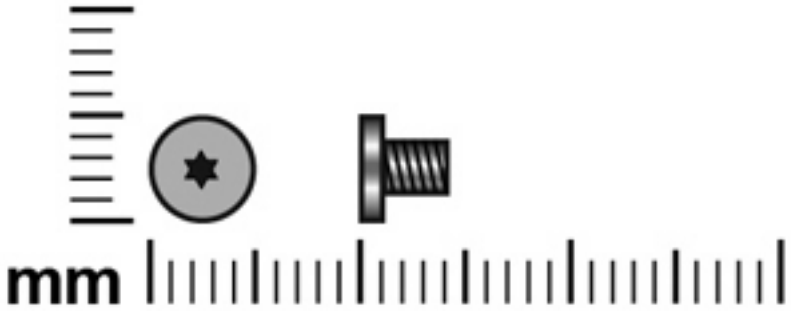


Color	Quantity	Length	Thread	Head diameter
Black	3	3.0 mm	2.5 mm	8.0 mm

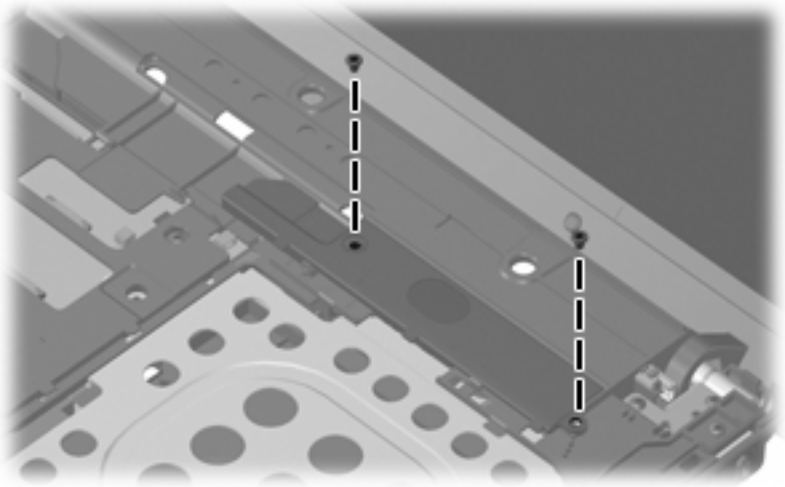


Where used: 3 screws that secure the switch cover to the computer

Torx T8M2.5×4.0 screw

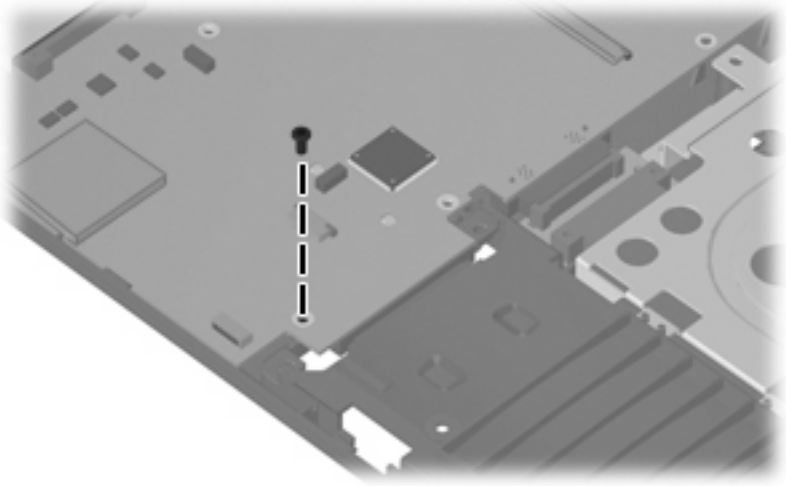


Color	Quantity	Length	Thread	Head diameter
Black	4	4.0 mm	2.5 mm	5.0 mm



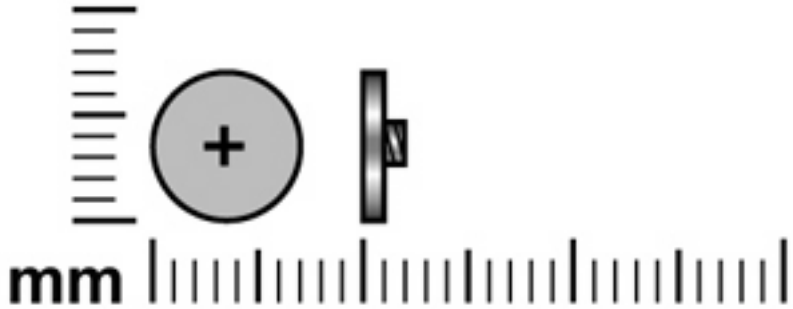
Where used: 2 screws that secure the speaker to the computer

Where used: One screw that secures the top cover to the base enclosure

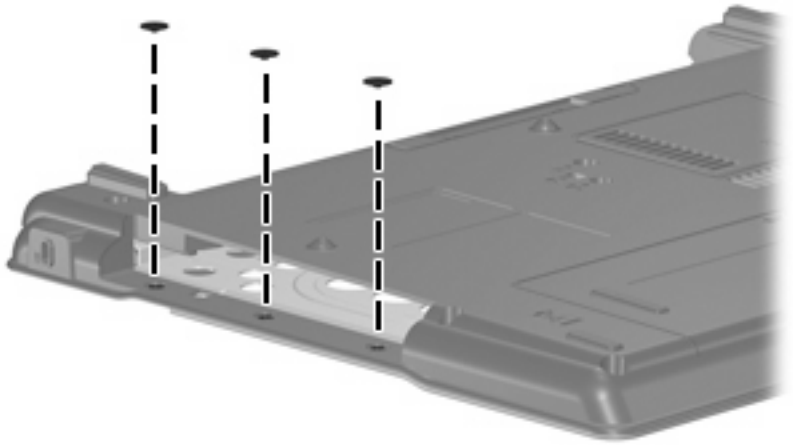


Where used: One screw that secures the system board to the base enclosure

Phillips PM2.0×2.0 broad-head screw

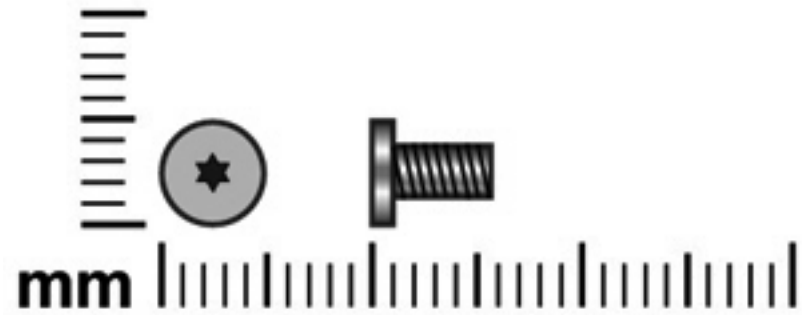


Color	Quantity	Length	Thread	Head diameter
Black	3	2.0 mm	2.0 mm	7.0 mm



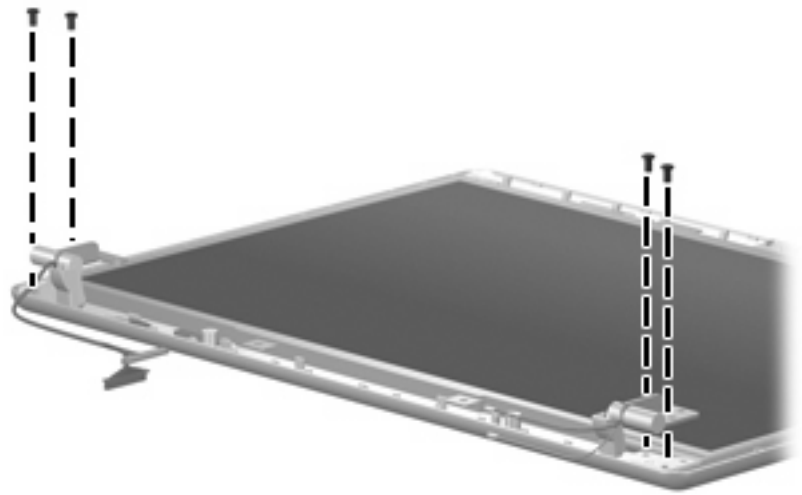
Where used: 3 screws that secure the top cover to the display enclosure

Torx T8M2.5×6.0 screw



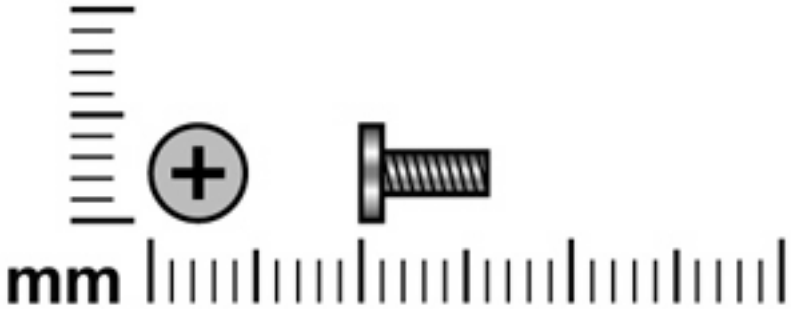
Color	Quantity	Length	Thread	Heat width
Black	12	6.0 mm	2.5 mm	5.0 mm

Where used: 8 screws that secure the display bezel to the display assembly

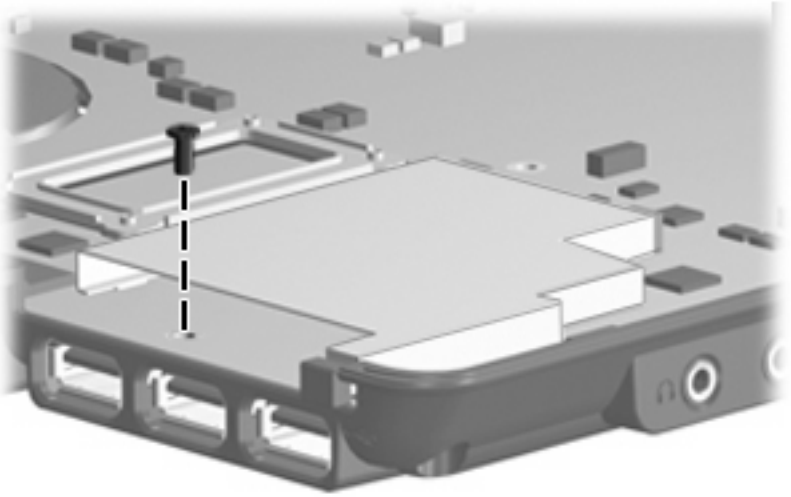


Where used: 4 screws that secure the display panel to the display enclosure

Phillips PM2.0×6.0 screw

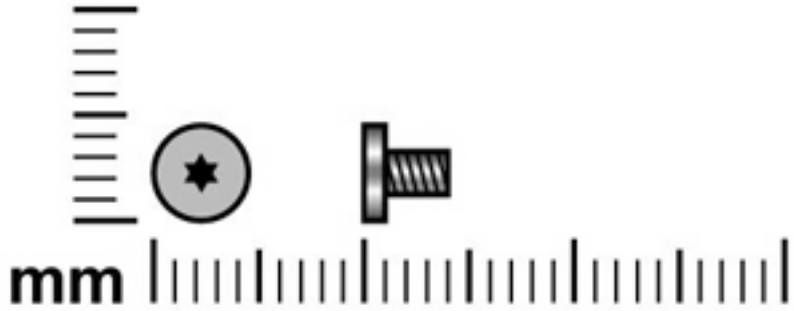


Color	Quantity	Length	Thread	Head diameter
Black	1	6.0 mm	2.0 mm	4.5 mm

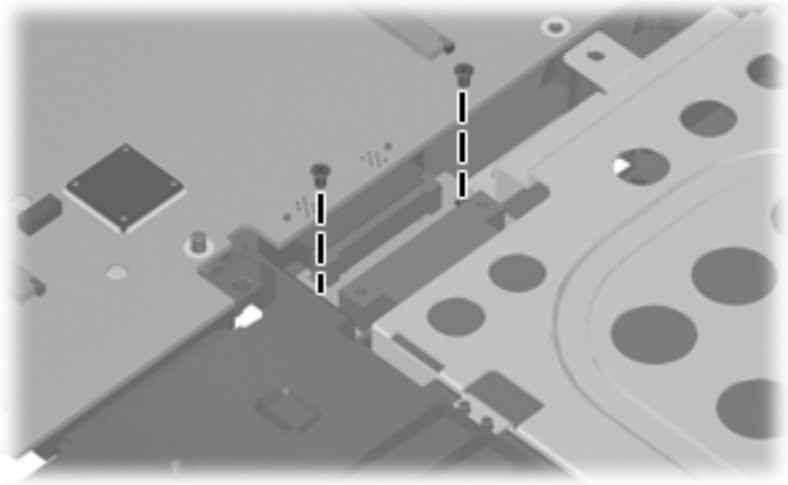


Where used: One screw that secures the system board to the base enclosure

Torx T8M2.0×4.0 screw

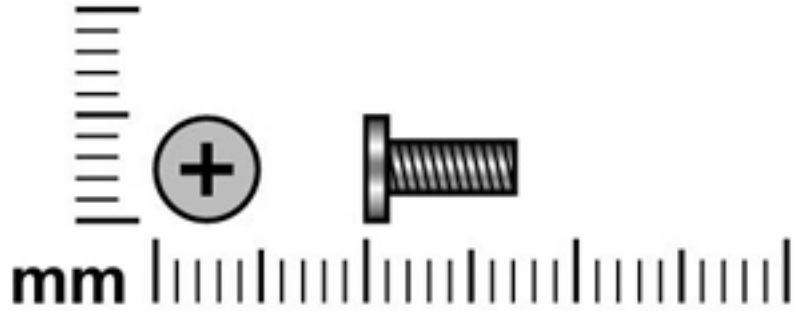


Color	Quantity	Length	Thread	Head diameter
Black	2	4.0 mm	2.0 mm	4.5 mm

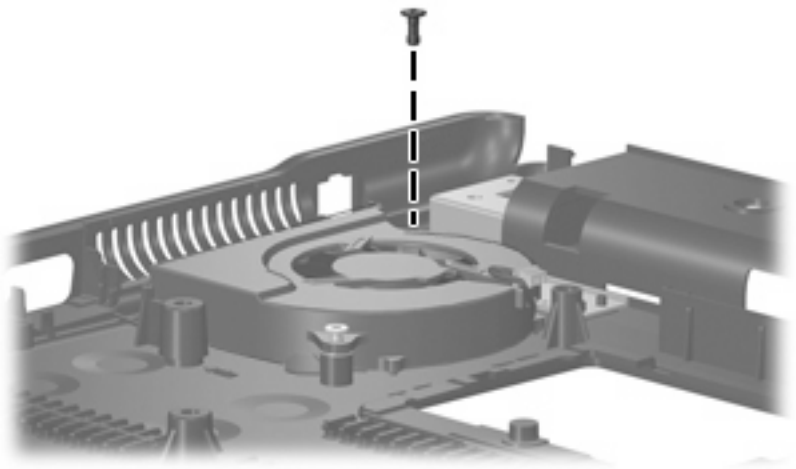


Where used: 2 screws that secure the optical drive connector board to the base enclosure

Phillips PM2.5×7.0 screw

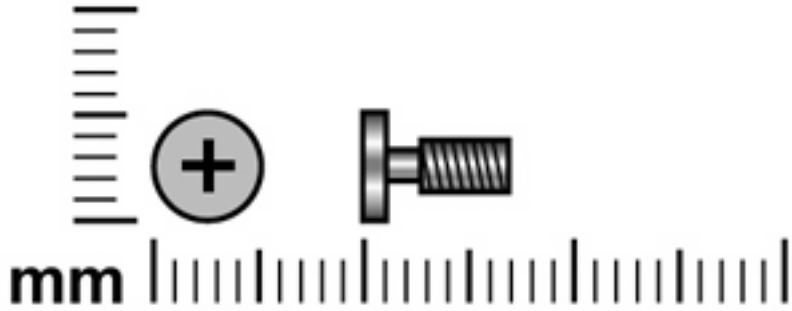


Color	Quantity	Length	Thread	Head diameter
Black	1	7.0 mm	2.5 mm	5.0 mm

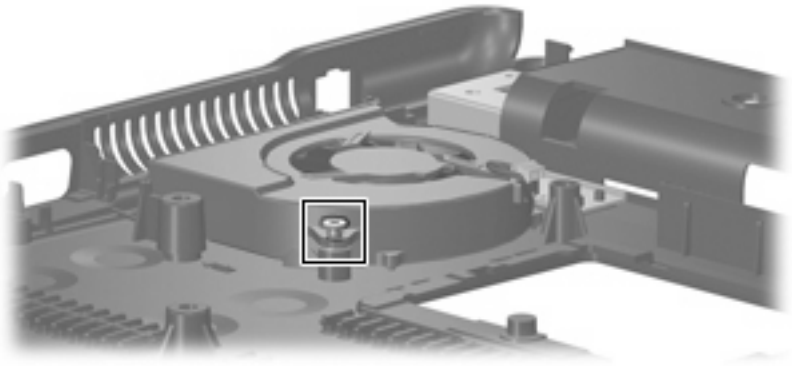


Where used: One screw that secures the fan to the base enclosure

Phillips PM2.5×7.0 captive screw

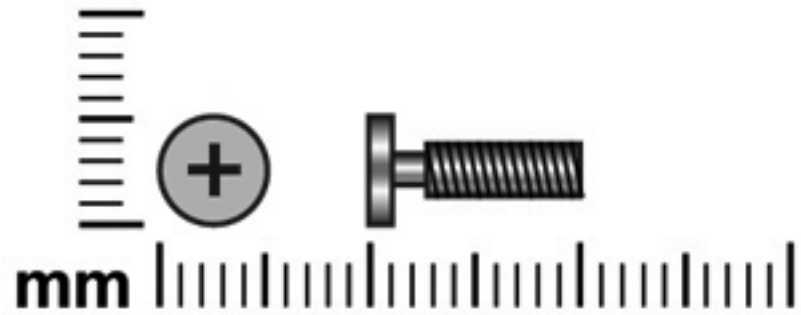


Color	Quantity	Length	Thread	Head diameter
Silver	1	7.0 mm	2.5 mm	5.0 mm

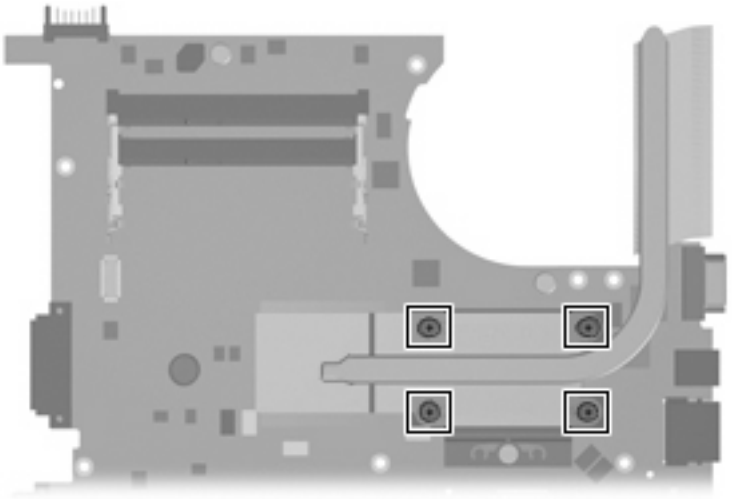


Where used: One captive screw that secures the fan to the base enclosure (screw is secured to the fan by a C-clip)

Phillips PM2.5×10.0 captive screw

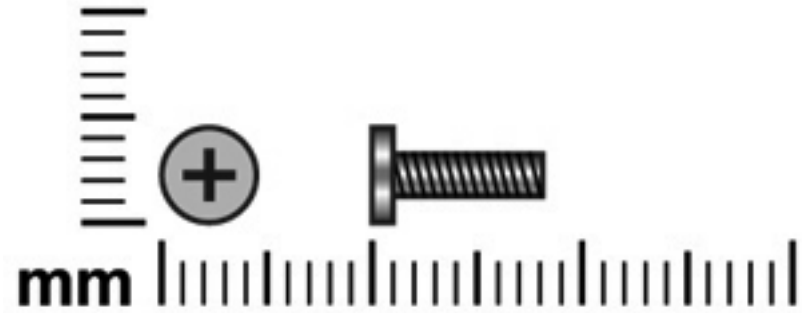


Color	Quantity	Length	Thread	Head diameter
Silver	4	10.0 mm	2.5 mm	5.0 mm

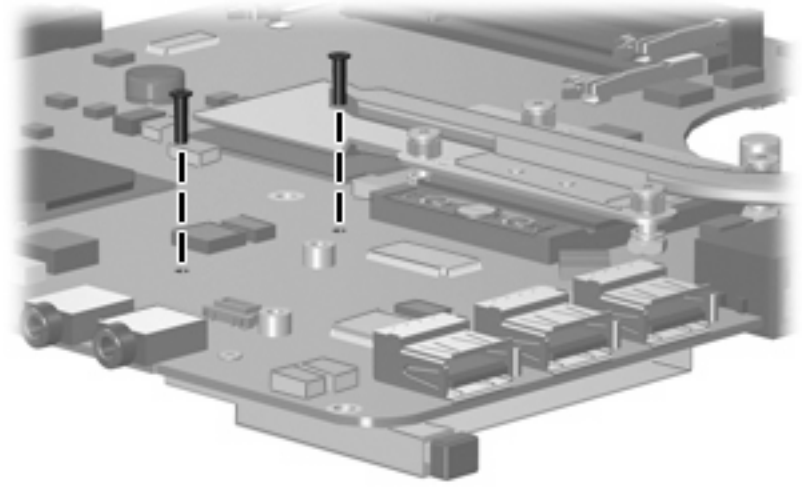


Where used: 4 captive screws that secure the heat sink to the system board (screws are secured to the heat sink by C-clips)

Phillips PM2.0×8.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	2	8.0 mm	2.0 mm	4.5 mm



Where used: 2 screws that secure the ExpressCard assembly to the system board

8 Backup and recovery

Creating recovery discs

After setting up the computer for the first time, be sure to create a set of recovery discs of the full factory image. The recovery discs are used to start up (boot) the computer and recover the operating system and software to factory settings in case of system instability or failure.

Note the following guidelines before creating recovery discs:

- Use any of the following types of discs: CD-R, DVD+R, DVD+R DL, DVD-R, or DVD-R DL (purchased separately). The discs you use will depend on the type of optical drive installed in your computer. Because DVDs store more information than CDs, DVDs and DVDs with double-layer (DL) support reduce the number of discs required.

NOTE: Read-write discs, such as CD-RW, DVD+RW, and DVD-RW, are not compatible with the HP Backup & Recovery Manager software.

- The computer must be connected to AC power during the process.
- Only one set of the recovery discs can be created per computer.
- Number each disc before inserting it into the optical drive of the computer.
- If necessary, you can cancel the disc creation before you have finished creating the recovery discs. The next time you select **Create a set of recovery discs (Recommended)**, you will be prompted to continue the disc creation.

To create a set of recovery discs:

1. Select **Start > All Programs > HP Backup & Recovery > Backup & Recovery Manager**.
2. Click **Next**.
3. Click **Create a set of recovery discs (Recommended)**, and then click **Next**.
4. Follow the on-screen instructions.

Backing up your information

NOTE: You can only recover files that you have previously backed up. HP recommends that you use HP Backup & Recovery Manager to create an entire drive backup as soon as you set up your computer.

With HP Backup & Recovery Manager, you can perform the following tasks:

- Backing up your information regularly to protect your important system files
- Creating system recovery points that allow you to reverse undesireable changes to your computer by restoring the computer to an earlier state
- Scheduling backups at specific intervals or events

When to back up

- On a regularly scheduled basis

  NOTE: Set reminders to back up your information periodically.

- Before the computer is repaired or restored
- Before you add or modify hardware or software

Backup suggestions

- Create a set of recovery discs using HP Backup & Recovery Manager.
- Create system recovery points using HP Backup & Recovery Manager, and periodically copy them to disc.
- Store personal files in the Documents folder and back up these folders periodically.
- Back up templates stored in their associated programs.
- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings.

  The screen shot can be a time saver if you have to reset your preferences.

  To copy the screen and paste it into a word-processing document:

  a. Display the screen.

  b. Copy the screen.

  To copy only the active window, press **alt+fn+prt sc**.

  To copy the entire screen, press **fn+prt sc**.

  c. Open a word-processing document, and then select **Edit > Paste**.

NOTE: Before you can perform backup and recovery procedures, the computer must be connected to external power.

NOTE: Drivers, utilities, and applications installed by HP can be copied to a CD or to a DVD using HP Backup & Recovery Manager.

Backing up specific files or folders

You can back up specific files or folders to the recovery partition on the hard drive, to an optional external hard drive, or to optical discs (CDs or DVDs).

NOTE: This process will take several minutes, depending on the file size and the speed of the computer.

To back up specific files or folders:

1. Select **Start > All Programs > HP Backup & Recovery > Backup & Recovery Manager**.
2. Click **Next**.
3. Click **Create or manage backups**, and then click **Next**.
4. Click **Back up user created files and folders**, and then click **Next**.
5. Follow the on-screen instructions.

Backing up the entire hard drive

When you perform a complete backup of the hard drive, you are saving the full factory image, including the Windows® operating system, software applications, and all personal files and folders.

NOTE: A copy of the entire hard drive image can be stored on another hard drive, on a network drive, or on recovery discs that you create.

NOTE: This process may take over an hour, depending on your computer speed and the amount of data being stored.

To back up your entire hard drive:

1. Select **Start > All Programs > HP Backup & Recovery > Backup & Recovery Manager**.
2. Click **Next**.
3. Click **Create or manage backups**, and then click **Next**.
4. Click **Create or manage Entire Drive Backups**, and then click **Next**.
5. Follow the on-screen instructions.

Creating recovery points

When you back up modifications since your last backup, you are creating system recovery points. This allows you to save a snapshot of your hard drive at a specific point in time. You can then recover back to that point if you want to reverse subsequent changes made to your system.

NOTE: The first system recovery point, a snapshot of the entire image, is automatically created the first time you perform a backup. Subsequent recovery points make copies of changes made after that time.

HP recommends that you create recovery points at the following times:

- Before you add or extensively modify software or hardware
- Periodically, whenever the system is performing optimally

NOTE: Recovering to an earlier recovery point does not affect data files or e-mails created since that recovery point.

To create a system recovery point:

1. Select **Start > All Programs > HP Backup & Recovery > Backup & Recovery Manager**.
2. Click **Next**.
3. Click **Create or manage backups**, and then click **Next**.
4. Click **Create or manage Recovery Points**, and then click **Next**.
5. Follow the on-screen instructions.

Scheduling backups

Use HP Backup Scheduler to schedule backups for the entire system, for recovery points, or for specific files and folders. With this tool, you can schedule backups at specific intervals (daily, weekly, or monthly) or at specific events, such as at system restart or when you dock to an optional docking station (select models only).

To schedule backups:

1. Select **Start > All Programs > HP Backup & Recovery > HP Backup Scheduler**.
2. Follow the on-screen instructions.

Performing a recovery

NOTE: You can only recover files that you have previously backed up. HP recommends that you use HP Backup & Recovery Manager to create an entire drive backup as soon as you set up your computer.

HP Backup & Recovery Manager helps you with the following tasks for safeguarding your information and restoring it in case of a system failure:

- Recovering important files—This feature helps you reinstall important files without performing a full system recovery.
- Performing a full system recovery—With HP Backup & Recovery Manager, you can recover your full factory image if you experience system failure or instability. HP Backup & Recovery Manager works from a dedicated recovery partition on the hard drive or from recovery discs you create.

Performing a recovery from the recovery discs

To perform a recovery from the recovery discs, follow these steps:

1. Back up all personal files.
2. Insert the first recovery disc into the optical drive and restart the computer.
3. Follow the on-screen instructions.

Performing a recovery from the hard drive

There are 2 ways to initiate a recovery from the hard drive:

- From within Windows
- From the recovery partition

Initiating a recovery in Windows

To initiate a recovery in Windows, follow these steps:

1. Back up all personal files.
2. Select **Start > All Programs > HP Backup & Recovery > Backup & Recovery Manager**.
3. Click **Next**.
4. Click **Perform a recovery**, and then click **Next**.
5. Follow the on-screen instructions.

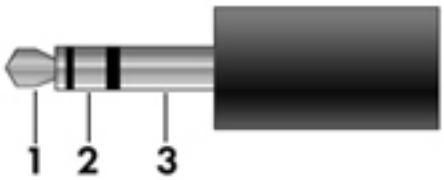
Initiating a recovery from the hard drive recovery partition

To initiate a recovery from the hard drive recovery partition, follow these steps:

1. Back up all personal files.
2. Restart the computer, and then press f11 before the Windows operating system loads.
3. Click a recovery option, and then click **Next**.
4. Follow the on-screen instructions.

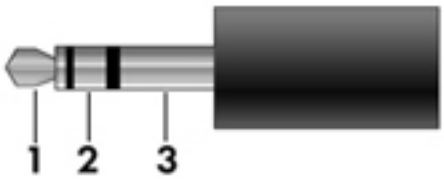
9 Connector pin assignments

Audio-out (headphone)



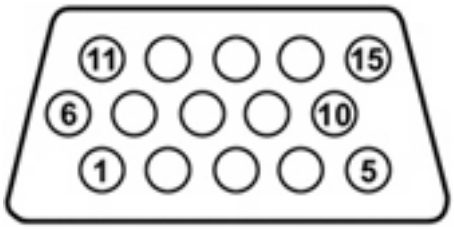
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

Audio-in (microphone)



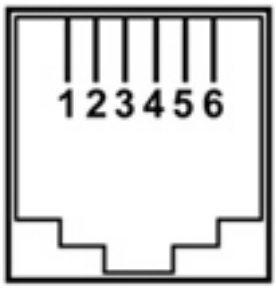
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

External monitor



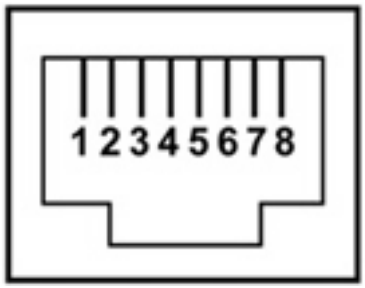
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

RJ-11 (modem)



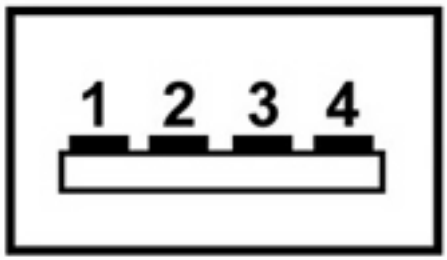
Pin	Signal
1	Unused
2	Tip
3	Ring
4	Unused
5	Unused
6	Unused

RJ-45 (network)



Pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
4	Unused
5	Unused
6	Receive -
7	Unused
8	Unused

Universal Serial Bus



Pin	Signal
1	+5 VDC
2	Data -
3	Data +
4	Ground

10 Power cord set requirements

The wide range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts AC or from 220 to 240 volts AC.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries and regions must meet the requirements of the country or region where the computer is used.

Requirements for all countries and regions

The requirements listed below are applicable to all countries and regions:

- The length of the power cord set must be at least 1.5 m (5.0 ft) and no more than 2.0 m (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
Korea	EK	4
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	CCC	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	4
The United Kingdom	BSI	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
5. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

11 Recycling

Battery

When a battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for computer battery disposal.

Display

⚠ **WARNING!** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

△ **CAUTION:** The procedures in this appendix can result in damage to display components. The only components intended for recycling purposes are the liquid crystal display (LCD) panel and the backlight. Careful handling must be exercised when removing these components. When you remove these components, handle them carefully.

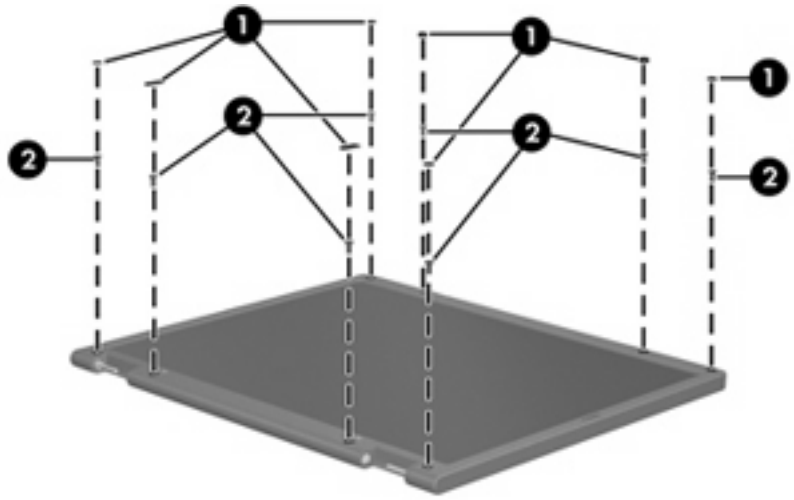
NOTE: **Materials Disposal**. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, or see the Electronic Industries Alliance (EIA) Web site at http://www.eiae.org.

This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.

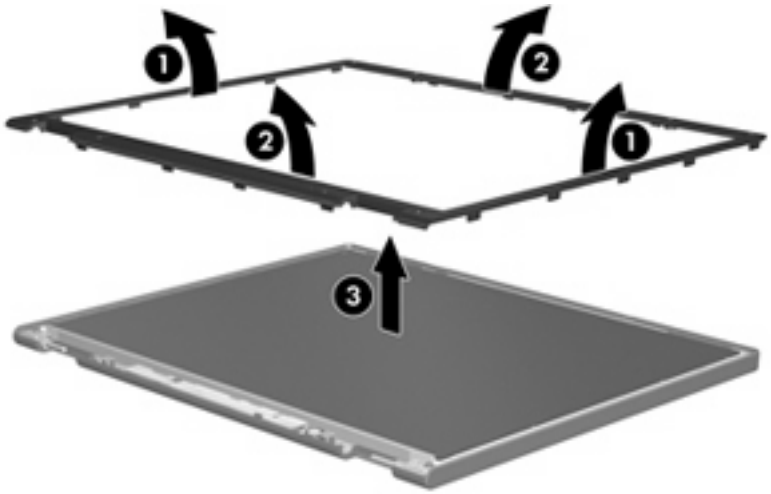
NOTE: The procedures provided in this appendix are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

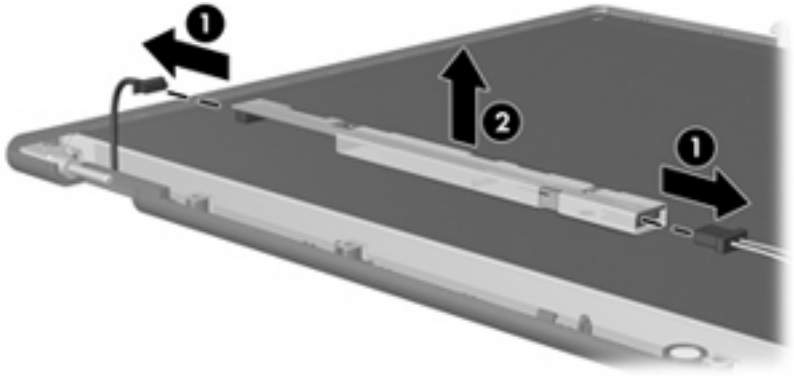
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.



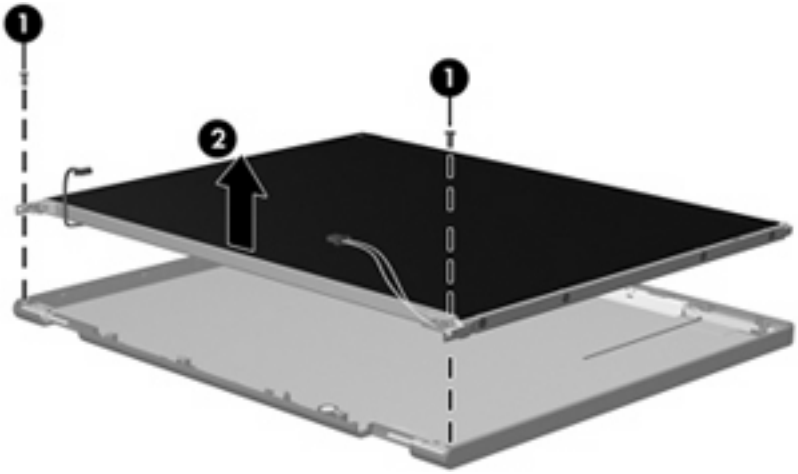
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel **(3)**.



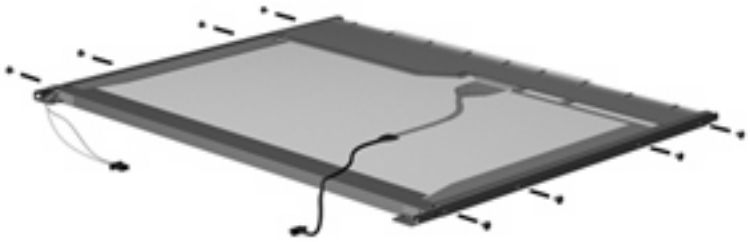
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.



5. Remove all screws **(1)** that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly **(2)** from the display enclosure.

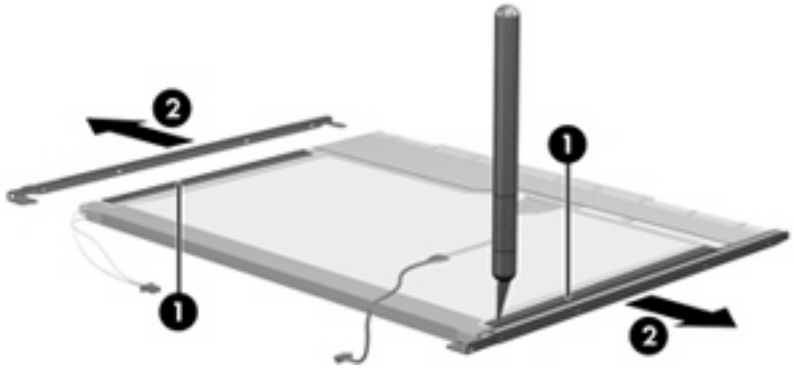


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.

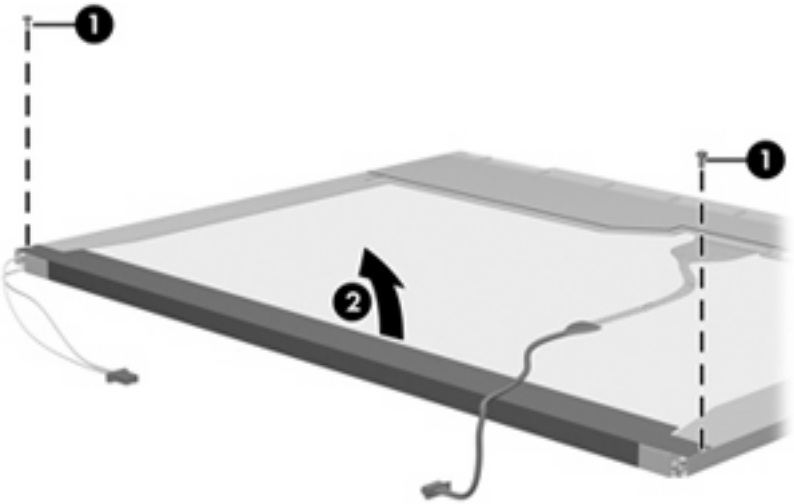


9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.

10. Remove the display panel frame **(2)** from the display panel.

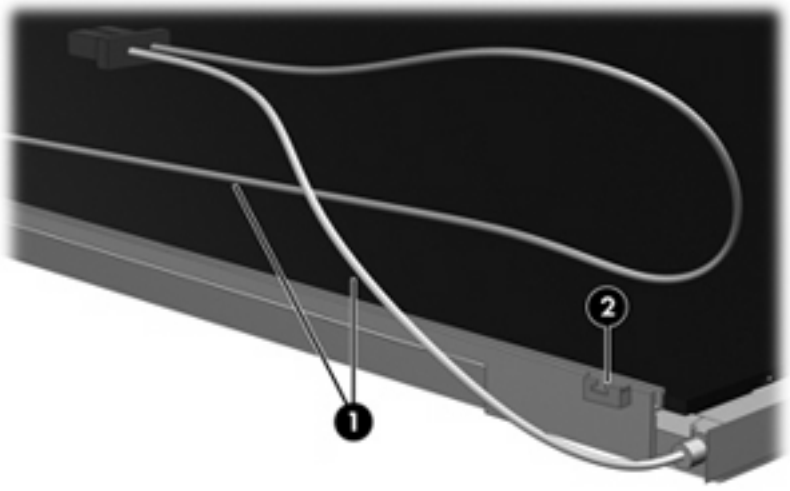


11. Remove the screws **(1)** that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover **(2)** and swing it outward.



13. Remove the backlight cover.
14. Turn the display panel right-side up.

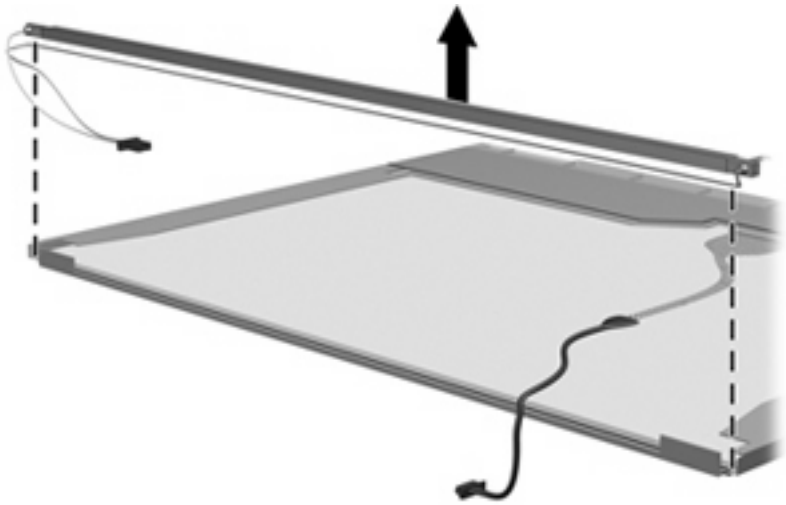
15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.



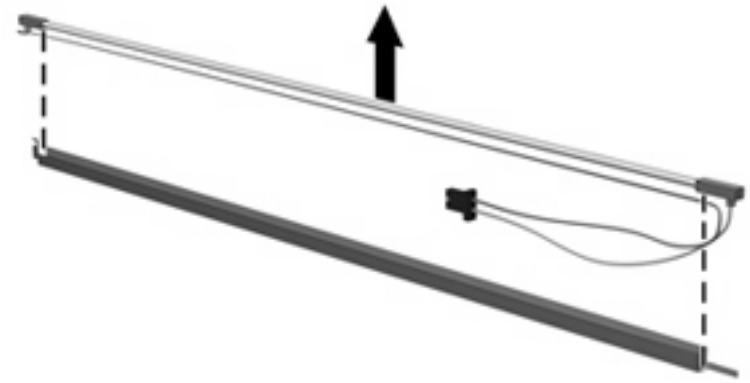
16. Turn the display panel upside down.

⚠ **WARNING!** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

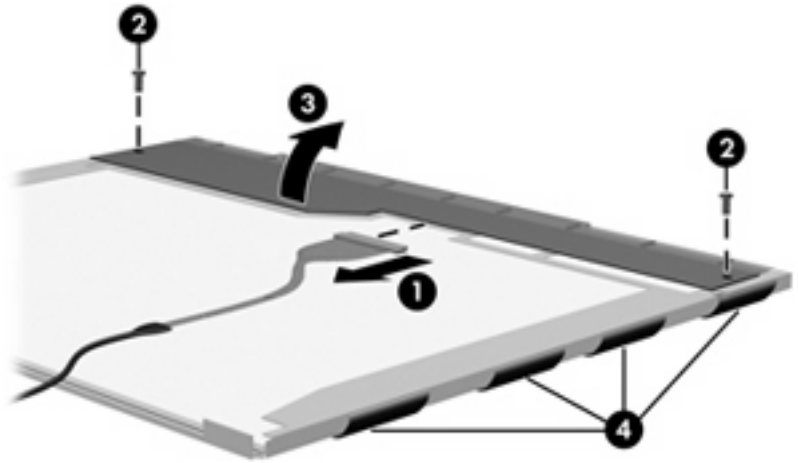
17. Remove the backlight frame from the display panel.



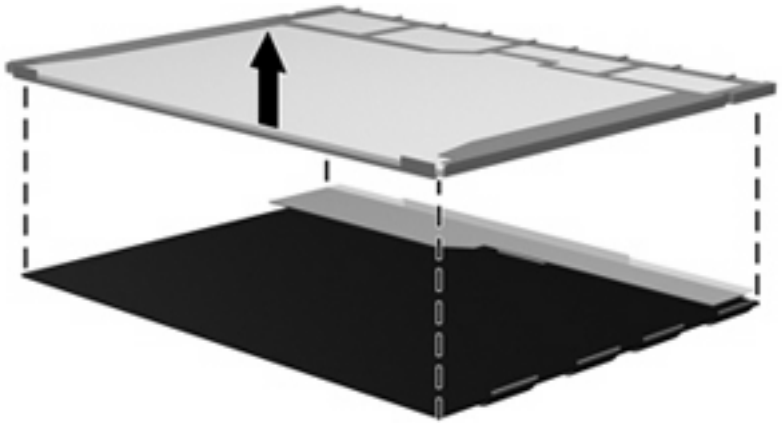
18. Remove the backlight from the backlight frame.



19. Disconnect the display panel cable **(1)** from the LCD panel.
20. Remove the screws **(2)** that secure the LCD panel to the display rear panel.
21. Release the LCD panel **(3)** from the display rear panel.
22. Release the tape **(4)** that secures the LCD panel to the display rear panel.



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

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